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Heat and Ventilation in a Large Foundry

The Plant of the International Harvester Company at Springfield, Ohio—A Fan System with Air Recirculating Arrangements

The proper heating and ventilating of a foundry building is often emphasized as a better investment and resulting in more lasting benefit to a manufacturer than the heating of his office, machine shop or erecting plant. In these last three departments it is only necessary to consider the fact that the men work more efficiently when warm and comfortable. In the foundry, apart from increased efficiency on the part of the workmen, the dense vapor and gas which is almost certain to be present when the pour is made, is eliminated, if the apparatus installed ventilates as well as heats the building. An interesting example is had in the new gray-iron foundry of the Champion works of the International Harvester Company at Springfield, Ohio.

The building is 676 ft. long and 150 and 225 ft. wide, and permits all the molding operations to be concentrated on one floor. At one end of the shop a space 150 ft. square has been partitioned off for the casting cleaning department and the auxiliary buildings, in which are located the core department, molding and core sand storage, coke storage, pattern vault, cupola house and the fan and heater room. Scrap bins are arranged on each side of the main structure.

The foundry building is of steel construction with brick curtain walls, and the sides and ends contain numerous

rows of windows to insure abundant light. While the original plans called for a sawtooth roof, the specifications were changed before the building was erected and a modified form of the Pond type of monitor roof construction was adopted. The steelwork supporting the roof and a portion of the roof is illustrated in Figs. 1 and 2. The roof construction and the location of the hot air ducts, which are placed above the crane rails, are shown in Fig. 1, while a cross-section of the building, which in addition to this also shows the location of the fans, is given in Fig. 2.

It will be noticed from this drawing that the roof is a decided departure from the V-shaped monitor type as it is regularly built. Ordinarily the peak of the monitor is the highest portion of the building and the ridge follows the center line of the structure, forming a long pocket under the roof, the highest point of which is some distance above the openings in the sides. This arrangement is regarded as reducing the ventilating capacity of the monitor and the gases and steam becoming cooled condense still more. It is emphasized that unless ventilators are installed in the roof of the monitor, the gases entrapped in the pocket may again descend to the lower level of the shop. In the type of roof adopted the sides of the monitor form the high points of the building and the roof

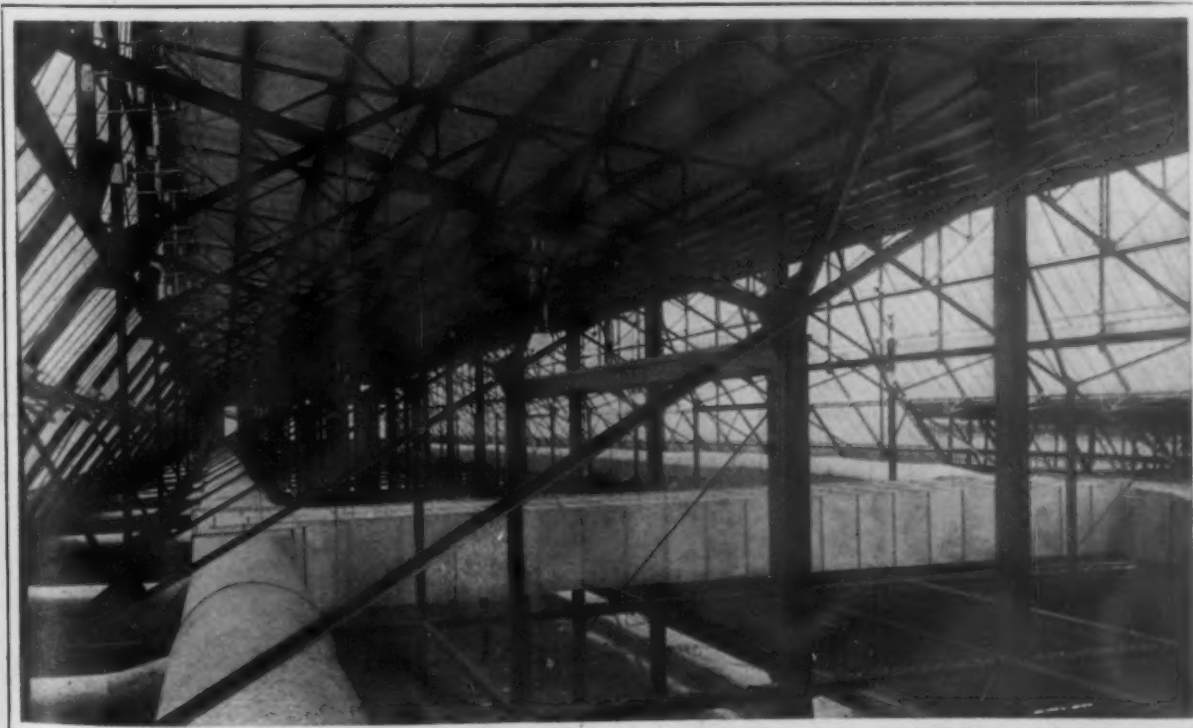


Fig. 1—A General View of the Ducts Over the Crane Rails in the New Gray-Iron Foundry of the International Harvester Company, Springfield, Ohio

is in the form of an inverted gable, with the ridge at the lowest point, an arrangement which, it is claimed, insures maximum ventilation and illumination. Another interest-

as stated, is used to drive each fan through a belt. In the morning, when the main object is the heating up of the building, the outdoor windows are closed and the warm

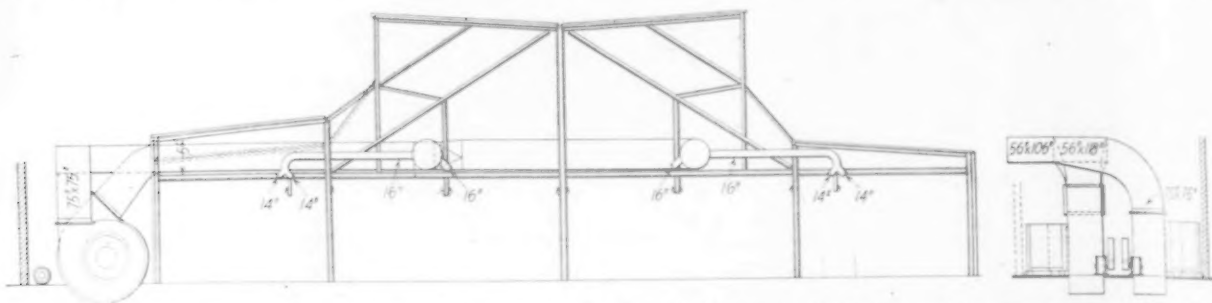


Fig. 2—A Sectional Elevation of the Foundry Showing the Arrangement of the Structural Members and Ventilating Ducts. The Concrete Roof Sloping Toward the Center Is a Noteworthy Feature

ing feature about the construction is that the main roof is of concrete, which cuts down the heat transmission losses and consequently reduces the amount of heat required to keep the building warm.

The heating and ventilating is accomplished by forcing

air is recirculated until the proper temperature is reached. As soon as pouring commences, however, the heat liberated by the molten metal is practically enough to keep the building comfortable, and ventilation with clean warm air is necessary to get rid of the vapor and gases formed.

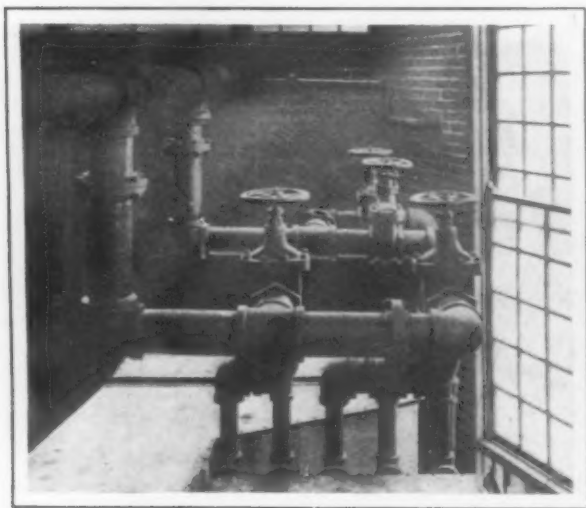


Fig. 3—The Steam Connections on a Heater Stack Which Allow Either Two, Three or Five Sections To Be Fed with Steam as Desired

warmed air into every portion of the building, but in the corerom direct radiation with ceiling coils is used. Two Buffalo steel-plate fans, each 210 in. in diameter, deliver approximately 200,000 cu. ft. of warmed air into the building every minute. The air is heated by being drawn through six double stacks of heaters and is distributed through the plant by galvanized-iron ducts. Steam for the heaters is brought from the boiler room, which is located a considerable distance away on the opposite side of Buck Creek, through a 14-in. main, and is used to heat the six double-height stacks of 50-in. Vento heaters.

Each fan draws air through three of these stacks, which are so located that the air can be drawn in from every side of the room, although ordinarily not more than two sides are used at once, and frequently but one. The steam connections on the heaters are illustrated in Fig. 3. It will be noticed from this engraving that the valves are arranged so that two, three or five sections of the heater in each stack can be furnished with steam in a usual way, according to the demand. The entire heater surface is equipped with the vacuum return system and the condensation from the heaters is collected and delivered to a 4-in. Buffalo motor-driven centrifugal pump, which forces this water back to the boiler room.

The fanroom proper, the interior of which is shown in Fig. 4, has windows opening into the main building and also outdoors. In this engraving are also shown the edge of the fans, the driving motors located on the wall, the main steam lead and the windows for admitting outdoor air. The fans in this room are so arranged that one discharges directly upward and the other at an angle of 45 deg. as required by the space limitations. A 50-hp. Westinghouse induction motor fastened on the wall of the room,

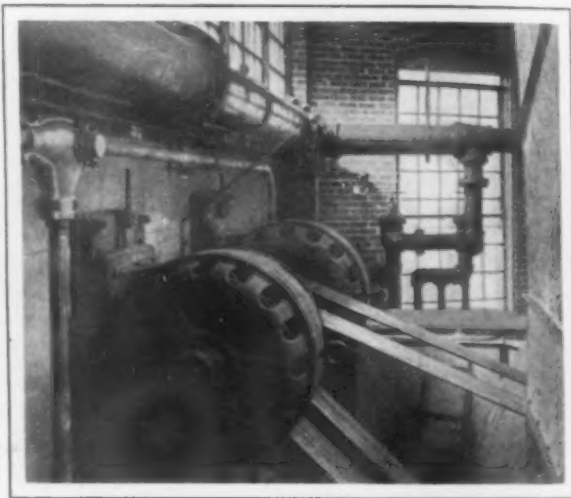


Fig. 4—Interior View of the Fan Room Showing the Edge of the Fan, the Driving Motors, the Main Steam Lead and the Windows for Admitting Outdoor Air

At this time the outdoor windows are opened, as shown in Fig. 4, and those from the main building are closed.

After leaving the fans the air is delivered to a large rectangular pipe, 56 x 224 in. in size, which in turn delivers



Fig. 5—The Main Distributing Ducts with the Fanroom in the Distance Showing the Arrangement of Windows for Returning Air to the Fans

it to the main ducts that run the entire length of each side of the building. A view of this large duct and the beginning of the two main distributing ducts, with the fanroom in the distance, is reproduced in Fig. 5. Four outlets which force the air toward the floor at an angle of 45 deg. are located at 20-ft. intervals. The forcing down of this warm air is planned to keep the air nearest the floor continually in circulation and also put the warmth where it is needed. Heat near the floor also keeps the vapor liberated when the pour is made from condensing and also in connection with the circulation causes it to rise and pass out through the monitor windows.

New Self-Dumping Underfeed Stoker

Extra Wide Grates a Special Feature
—Other Interesting Mechanical Details

The most conspicuous feature of the new Riley self-dumping underfeed stoker, which has recently been brought out by the Sanford Riley Stoker Company, Ltd., Worcester, Mass., is that in the new stoker the moving fuel bearing grates extend across the entire width of the furnace. Other special features claimed are continuous and automatic discharge of ashes, simple construction, small width per horsepower, the complete separation of the ash pit and the fireroom, and the small amount of headroom required. Fig. 1 shows the stoker, while Fig. 2 is a view showing the retorts, moving overfeed grates, ash supporting plates, etc.

These moving fuel bearing grates, as can be seen by an examination of both Figs. 1 and 2, carry the fuel down an incline of about 20 deg. The feed is of the positive forced type and is made up of the combined motion of a plunger in the retort at the right of Fig. 2 and the moving grates. This arrangement, it is emphasized, distributes coal evenly and insures active combustion over the whole fire surface by providing a freer and more uniform passage of air through the coal. The discharge of refuse is continuous and automatic, instead of periodic. At the lower end of the overfeed grates are pusher noses, shown in Fig. 1, which force the refuse slowly but continuously toward the bridge and then on and over the ash supporting plates, which are hinged together in the form of an apron. The plates of this apron hang down over the end of a rack, as shown at the left of Fig. 2, and control the size of the opening. The size of this opening is adjustable by hand and the discharge capacity can be regulated by the amount of travel given to the pusher noses.

The air supply is mechanically maintained in a definite ratio to the amount of coal supplied by driving both the

stoker and fan from the same shaft. Smoke prevention is also claimed for this stoker as the hydrocarbon gases are distilled beneath the surface of the fire and rise through a bed of incandescent coke, where they are subjected to an intimate mixture of air at high temperature and pass off as invisible and completely burned gases. This is a special feature of the new stoker and the fuel bed is not periodically broken up as the cleaning is continuous and automatic.

The formation of clinkers above the air openings is said to be prevented by the continual reciprocating motion of the moving grates which is in opposite directions for adjacent retorts, thus forming a shearing line between each pair and breaking up the clinkers. The shearing action between the moving retort side and the sidewall of the furnace tends to keep the brickwork free and the crusher action of the pusher noses at the bottom of the overfeed grates prevents the accumulation of large size clinkers at this point.

There is only one plunger for each retort. All of the parts are made interchangeable without any fitting and there are practically no right and left parts, everything

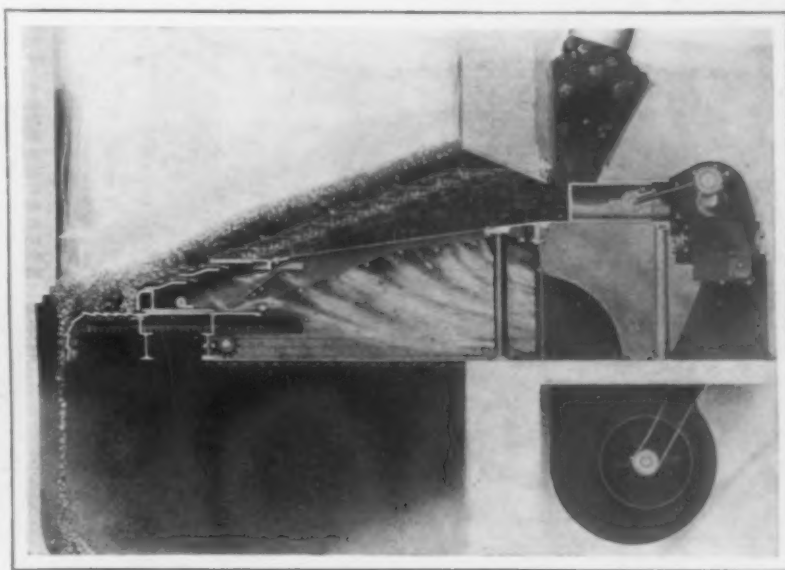


Fig. 2—View Showing Retorts, Moving Overfeed Grates, Ash Supporting Plates, Etc.

being in the retort units. If by any chance an obstruction should become caught in front of a plunger, only that one will be blocked, and the most serious damage that can be done is the shearing of a pin, which forms the safety device. This arrangement reduces the amount of fire area temporarily deprived of fuel and it is only necessary for the attendant to overhaul the fuel in one retort. The driving mechanism of the stoker is simple, visible from the outside and readily accessible. The air space underneath the stoker can be reached through the door or through the opening in the front air plate on the side door. The moving retort sections are large and readily accessible and if desired, whole sections can be disconnected at will from the driving mechanism and removed or replaced without disturbing any other part or section.

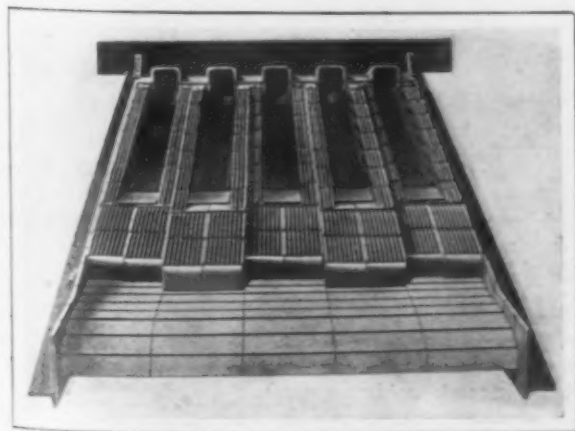


Fig. 1—A New Self-Dumping Stoker of the Underfeed Type Built by the Sanford Riley Stoker Company, Ltd., Worcester, Mass.

The Eastern sales offices of the Deforest Sheet & Tinplate Company, represented by Marcus L. Filley, will move February 15 from their present quarters in the Tribune Building, New York City, to 30 Church street, rooms 508-518. An increasing demand for Deforest coupon Lohmannized sheets necessitated the opening of a department for the handling of this line, and the new offices are arranged to include this department as well as the export business which will now be handled through Mr. Filley in New York.

The Nelson Valve Company, Philadelphia, Pa., announces that its Chicago office is now located at 174 North Market street. The McMaster-Carr Supply Company will act as direct representative, carrying a full stock of Nelson valves.

The Human Element in Industry*

Further Details of the Work of the Service or Economics Department—Importance of the Shop Physician

BY WINTHROP TALBOT, M.D.†

(Concluded)

Man must be the interest of manufacturers today. The demands of sentiment, of charity, of philanthropy, are not the forces which have brought about this change, but the pressure of modern standards of business management. It is an economic question through and through, and the economic horse must pull the welfare wagon first, last and all the time, if progress shall be made. If the employee produces better results through having good ventilation, cleanliness and such reasonable conveniences as make for health and contentment, it is worth while for the company to provide these things. A scientific criterion, if such were desired, of the economic value of sane working conditions would be to make absolute tests, noting the output, breakage, absence, tardiness and laying-off under present conditions compared with the same under improved conditions.

The old relation of patron and servant has no place in a modern democratic industrial organization where the day laborer sooner or later may become a high official, and where the ultimate basis of successful work is not caste, rank, "pull" or competition, but brains, education, training, skill, intelligent co-operation and emulation.

Filth

The consideration of dust in our first paper leads us immediately to the thought of general cleanliness. We must consider first the prevention of filth, and, second, its removal. The Navy Yard in Brooklyn has entirely done away with spitting in its shops, and I can see no more reason why workmen should be encouraged or permitted to spit on the floor than to smoke cigars or pipes while at work. Cards like these are posted in some shops:

SPITTING
SPREADS
SICKNESS

DO NOT SPIT ON THE FLOOR
TO DO SO MAY SPREAD DISEASE

It is certainly true, however, that the shop may be compared with the schoolroom, in that all human beings, whether adult or child, employer or employed, are affected by force of example; and if the superintendent or foreman goes about the shop chewing and spitting, no posted rule will ever persuade a workman that he has not this right as well.

Cleansing Processes

Methods of cleaning should be adopted which do not simply move the dirt from one place to another. The corn broom and dry duster are dust movers, not dust removers. Dry sweeping is a germ distributor. Dry sweeping, always to be criticized, should never be permitted in a room where there are human beings or any other sensitive mechanical apparatus; but I have seen shops that have habitually kept employees idle for 15 minutes before 12 o'clock, in order not to have them leave before noon on Saturday, and during that 15 minutes vigorous sweeping was going on, filling the air with germ-laden dust, carrying colds, bronchitis, pneumonia, diphtheria and consumption to all, and infecting with disease those with less power of resistance.

The dustless broom, the dustless brush, wet sawdust and sweeping compounds, hygienic floor brush, vacuum cleaning—these methods are available today, and should replace the insanitary, old-fashioned corn broom, mop and pail.

Lockers and Dressing Rooms

Under the general head of sanitation and hygiene naturally would come the consideration of lockers for clothing. Modern shops have individual lockers. The

preferable form is the metal locker with solid metal partitions, but visible throughout the whole length of the front for inspection and ventilation. The tightly closed locker is an abomination. The locker must be kept sweet and clean, and its orderliness will be a good indication of the character of the owner. There may not be any better way of learning the tendencies of a workman than by noting the way in which he keeps his clothes. If he is neat and orderly in that particular, he is almost always neat, exact, orderly and economical in other directions. The man who keeps his locker in a disorderly state is likely to be wasteful at the bench.

Lockers should be provided if illness is to be prevented. It cannot be considered good shop practice to be so lacking in facilities that workers shall have no place to keep a shop suit or overalls, or to change and dry the footgear. I have found in investigations undertaken during the last year that a large percentage of absence is caused through workers taking cold by being obliged to work in rain-soaked garments or by going out of doors in sweat-soaked clothing that they have worn all day in the shop. This is true not only of women workers but also of men.

Every one has a right to prefer to work in places where he can have a locker to leave hats, coats and other garments in safety during work hours, and this right he will exercise when practicable.

Lavatories and Fountains

The trend of the best organized shops is to individual basins, as increasing the self-respect of workmen and helping to attract the better class of labor. In the end good plumbing is the cheapest. Poor lavatory facilities invite the propagation of venereal diseases—the "black plagues" of society today.

A basement lavatory without its own ventilator, or so placed as to contaminate the air of workrooms, is an abomination, and should be sufficient cause for criminal proceedings against a builder or owner.

In many states the common drinking cup has wisely been abolished by law. Drinking fountains are desirable, and the type which provides a sufficient and constant stream so that the lips of the person drinking cannot touch the apparatus is best; but in many occupations every worker can provide himself with glass or drinking cup of his own, and keep it at his place.

Illumination

The attention of all employers is being specially directed in these days to the question of illumination and the conservation of human sight in industry. The main points to be considered with regard to illumination, as in ventilation, relate mainly to comfort. Simply because there is a lot of light in the shop, the shop is not necessarily well lighted; in fact, overlighting may be as bad as underlighting. Either may be classed as poor lighting. A glare may be more uncomfortable and fatiguing to the eye than a dim light.

Certain conditions demand general illumination. In such cases bright sunshine is usually detrimental, as in a case cited later under "Accidents"; yet in many shops the sun shines dazzlingly at some hour of the day on certain machines, and no effort is made to remedy it. In artificial illumination of a general kind results are more satisfactory and less wasteful as a rule if the lamps are placed high and in clusters.

When work requires concentrated attention, as in book-keeping or special operations, and artificial light is employed, the mistake is as often made of supplying too intense light as of supplying too little. Just as it is distressing to attempt to look at the sun, the source of natural illumination, so it is fatiguing to compel the eye to rest upon the

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artificial source of the light itself, or upon dazzling spots in the working field of vision.

Another rule applicable in most cases is that illumination upon a given bit of work should come from behind, or if a lamp be used to shed its light direct upon the work in hand it should be screened from the eye. Flickering lights are bad, and lights which distort, discolor or disfigure may be suffered only when other factors greatly outweigh these objections. Lights which contaminate the air through the production of noxious gases are to be condemned in rooms and enclosed spaces where artificial ventilation is necessary.

Lunch Rooms

It is legitimate and proper for an employer to take this attitude. "The contented workman is a profitable one; contentment is based largely on sound health and a chance for promotion. I can at least try to produce good working conditions and proper reward for effort, as matters of profitable business if nothing more." The adoption of this attitude has played a large part in the success of plants which are notably progressive.

Let us take, for example, the matter of the lunch room. Every worker needs to have a clean and attractive place in which to eat lunch. Such a place he has a right to expect, and an eating room well managed saves outlay for the firm in unconsidered ways; and under the direction of a clear-headed woman trained in home economics will pay its way.

There was a time when the question of providing lunches for workers was regarded in a measure as a charity or kindness. Observation and experience have demonstrated not only that where plants are isolated or surrounded by low-class saloons it is advisable to provide a lunch room, but that in every case where 50 or more people take their lunch in the works the lunch room should be made to pay its way after the initial installation.

Many working people have not a good appetite in the morning, and come to their labor either without breakfast or after drinking merely a cup of badly prepared coffee. Most laborers are small eaters at the best, and it is therefore especially worth a manager's attention to see that the afternoon work is made as effective as may be through supplying an opportunity for the workman to get an appetizing and nourishing noonday meal. The cold dinner is a knock-out drop for afternoon energy.

Work Clothes and Accidents

The consideration of prevention of injuries must include ill-fitting garments, long sleeves and sleazy shoes as a direct invitation to stupid accidents. I believe that insurance policies used to include "act of God" in referring to certain types of injury, but we are learning that when accidents occur and injuries follow, we should study the shortcomings of our own ignorance and lack of forethought.

It is impossible here to consider at length the question of machinery guards, but it is worth while to mention accidents arising from monotony of occupation. Cases have recently occurred where glancing sunlight on bright metal in punch presses have hypnotized workers and caused repeated accidents. The remedy has been simply the shading of the window through which the sunshine came or the moving of the machine itself. Careless placing of machines and prolonged employment of the operative on one monotonous process produce harmful and wasteful results in many instances.

The Woman Counsellor

Apart from fresh air, cleanliness and good lighting, which are essential, other conditions affecting profit and loss in the factory exist which may be discovered and rectified.

A well-known and highly successful firm manufacturing table condiments and foodstuffs undoubtedly owes a considerable percentage of its profits to the tact, experience and loyalty of a woman who mothers all the 600 girls in the home factory. It is she who knows the home conditions; to whom every girl can go in case of sickness; who keeps in touch with the varying daily output of each worker; and it is she, a woman among women, who knows and anticipates the expression of the girls' needs. It is largely because of her that strikes, shortage of labor and

other disorders are unknown by the firm and have always been a negligible item in the cost of production.

The sister of one of the most successful makers of automobiles in the country, throughout the days of his successes in other lines, threw her interest into the needs of the factory girls, and brought it about that no such thing as a labor problem ever presented itself, so laying the foundations for his financial success.

The woman factory counsellor, kindly, sympathetic, keen, tactful, experienced, will play an important rôle in the future wherever girls are employed in a factory.

Medical Treatment

In line with the above thought comes the establishment of medical centers in each plant, not only for the treatment of injuries, but for the prevention of ill health, contagion, infection and disease. Workmen cannot be convinced that they should employ a physician for slight ailments, yet these, if neglected, often involve serious disease and infection.

Big troubles begin small. I recall a fine, responsible working woman who ran a tiny bit of wire into the end of her thumb just beneath the skin. The foreman pulled it out, as he thought; she tied a rag around the thumb and went to work again. Soreness continued, grew worse, the bone became involved; thus what was a trivial injury, through neglect resulted in pain and suffering for six months, loss of service and much expense to the firm. All injuries, such as scratches, cuts, bruises, foreign matter in the eye, and splinters in the hands, should be given antiseptic treatment as a matter of routine. Colds and sore throats are contagious and should be treated as such, and not be allowed to spread through a whole set of workers. I have known the work of 200 employees to be crippled for a week through the spreading of tonsillitis from one neglected case to all the girls employed in one important pivotal department. The financial loss would have sufficed to run a medical office for a year.

Every superintendent worthy of the name can recall from his own experience scores of instances similar to those stated.

Many concerns have established a medical service in connection with their plants, and in every case the value of such a service has paid for itself many times over. It is no longer a debatable question of policy, but simply a matter of detail and method in installation. Prevention in every case is better, and cheaper, than cure, and where absenteeism means idle machines, and owners are alert enough to their own interests to study costs, the value of the medical service is so self-evident as to require no particular exposition of its benefits.

Wherever there exists modern expert executive attention to leaks and waste, there is also bound to come sooner or later the appointment of a medical staff officer. He should pass on plans for all construction, in so far as they relate to ventilation, plumbing, heating, lighting, lavatories and dressing rooms, dining rooms and emergency and hospital facilities. It would be for him to determine as far as possible what physical or social causes, avoidable or otherwise, underlie labor difficulties; to regulate the sanitation and hygiene of the working force during working hours, and to devise such methods of unconscious education and training, and of exciting interest among the employees themselves, as will make them more able and desirous, through a knowledge of right living, to become stronger and more productive members of the community in so far as they are related to the factory management.

The medical officer should be the intimate and valued aid and friend of the manager, and should be responsible to him only. The personality of the medical officer will determine largely the amount of saving and benefit made possible. If he is humane, sympathetic, with good judgment and able to command the confidence of the workers, he can do much to foster the best kind of loyalty and enthusiasm. The gruff, cold man will repel every one. The cigarette-consuming lightweight will impair discipline. A good, conscientious man, well-equipped professionally, and not lacking in the saving grace of humor, can be found. His salary should be that of the best-paid department executive, because proper professional education and training is costly both in time and money, and the work itself demands the highest type of manhood.

Inspection and Superintendence

If it be worth while to have a millwright employed especially to attend to the tightening of belts, to increase transmission of power, it is certainly worth while in every shop to appoint a competent and interested man, one sensitive to air conditions, heat and humidity, to look after ventilation, temperature, dryness and moisture, and let us include the illumination of the plant.

"What is everybody's business is nobody's business"; and I find many shops with excellent methods of ventilation, for instance, but no one appointed to see that the expensive mechanism is so utilized that comfort is insured to the working force. If indeed this duty be in the hands of any one it is usually the foreman of the room, who is often not informed as to the effect of working conditions on production and is not interested, or he is already overburdened with other detail. At all events, it is better practice to put the responsibility for such matters in the hands of one rather than many.

The human touch, the human relationship of employer and employed, which has so generally existed in a spirit of intelligent co-operation, not only is tending to disappear, but no means are being taken to supply its place. In industrial plants there should be organization of executive management for the human factor in production. In other words, there should be a Service Department or Department of Economics which will accomplish for the human mechanism what the chief engineer and his department do for the machine. The establishment of such a department is the practical and cheapest method of handling human comfort and efficiency through working conditions. Departments are highly organized at large expense for purchasing, accounting, transportation and engineering, but as a rule no department whatever to deal directly with the needs of the men and women who work for the concern. More strange than all, even so-called departments of efficiency seldom deal with human needs. No industrial establishment in the land—and I believe this to be a conservative statement—is adequately equipped with an organized department dealing with the smooth running of its complex, costly human mechanisms.

I challenge correction in this matter. High salaried officials are permitted to exhaust their energies working in bad air in stuffy offices; delicate girls work in low-ceiled rooms tainted with odors from basements and lavatories; workers in grime and filth are encouraged to stay dirty, and allowed to return to their homes and children unclean, and so spread disease—and it is no one's business or duty to study and remedy what is wrong.

The main difference between the machine and the human mechanism lies in the fact that when you scrap the machine it is the machine alone which is destroyed, often to be replaced with one more modern and at less cost; whereas when you scrap a man the community pays for those dependent upon him. If thought be given to this matter of the service or economics department its economic necessity becomes apparent; but space does not permit further discussion of this function of management.

Human Conservation

We are well within the period of conservation in this country. No longer may we waste material of any kind with impunity, least of all may we waste men; not because of lack of numbers, although that plays its part in times of activity as at present, but because of the growing general intelligence and the fact that people will not suffer it; the fundamental reason, of course, being that the community must pay for waste by the individual.

The fostering of human conservation means greater dividends in money, contentment and human happiness. It heals wounds, it stills the contention of discord, it unites the employer and employed in their single and common interests. It is a constructive force amid our industrial problems, of untold worth to the surest upbuilding of the nation's life.

What greater usefulness may we seek in life than to further in such ways as we each may the cause of Conservation in Industry?

The Olmsted-Flint Company, manufacturer of belting, has removed its office from 136 Liberty street to 33-37 Sullivan street, New York.

A Locomotive Crane with a Long Boom

For the past year or longer, locomotive cranes have been used with very satisfactory results by contractors and steel fabricators in handling structural steel in the erection of factory buildings and other steel structures which are of a height that permits the use of a locomotive crane for this purpose. Special machines for this class of work have been added by some of the crane builders to their lines, these locomotive cranes being designed for such building construction work as setting girders, columns, trusses, purlins, etc. A new crane of this type was recently built by the Browning Engineering Company, Cleveland, Ohio, for the Virginia Bridge & Iron Company, Roanoke, Va., this particular one being ordered as a bridge builders' erection outfit. An important feature of the crane is the length of its boom, which is 75 ft.

The boom, which is built in three 25-ft. sections, is constructed so that the center portion can be taken out when it is desired to use the crane with a boom of the standard 50-ft. length. The total height of the boom above the ground is 81 ft., and this makes it possible to handle and set in place readily steel on a building to a height of 60 ft. The crane is steam driven and has a main hoist drum to raise and lower the load and an auxiliary hoist drum to raise and lower the boom. The power for hoisting is applied through a friction clutch and a train of spur gears and the lowering of the load is accomplished by a band brake on the drum, although heavy loads



A New Type of Locomotive Crane Having a Variable Length Boom Developed by the Browning Engineering Company, Cleveland, Ohio

may be lowered against steam pressure. Raising and lowering the boom is accomplished by applying a jaw clutch and running the engines, the power being transmitted through a train of worm gears. The worm gear is also used to hold the boom in position. Hoisting, slewing and traveling can be done simultaneously and one man controls all the operations. The rotating gear for slewing the boom in either direction is regulated by two friction clutches and a train of spur and bevel gears, being entirely independent of the direction in which the engines are run. A friction clutch and a train of gears control the traveling gear for propelling the crane.

The lifting capacity of the crane ranges from 10 tons at a 15-ft. radius, to 1 ton at a radius of 70 ft. The crane has a hoisting speed of 100 ft. per minute and with a full load will travel 500 ft. per minute. The rotating speed is 5 r.p.m. The crane is mounted on two M. C. B. type standard gauge trucks. The truck wheels, eight in number, are 24 in. in diameter, and are made extra heavy with special M. C. B. treads.

The Employers' Association of Architectural Iron Workers will hold its annual dinner on Saturday evening, February 15, at the clubrooms of the Building Trades Employers' Association, 30-34 West Thirty-third street, New York.

The Development of Electric Welding

Recent Thomson Machines, Including an Example of Spot Welding Apparatus

Electric welding has become an important factor in the metal industry during recent years, and the scope of its operation has been enlarged rapidly. While some of the machines are capable of a considerable range of welding, handling a variety of shapes and sizes, the process has been found particularly adapted to duplicate work, owing to the rapidity with which it can be produced, and various forms of automatic machines have been perfected for the purpose. The apparatus shown in the illustrations give an idea of the range of application developed by the Thomson Electric Welding Company, Lynn, Mass.

Spot welding has been developed into a much used process because it is an economical substitute for riveting and similar operations. One common method is the welding of metal at bosses which have previously been formed for the purpose. Either all the points are welded at one time, between two ring electrodes, for example as shown in Fig. 1, or one spot at a time by the use of point electrodes. The process is equally effective when the welding is done between

plain surfaces, the spots having well defined areas of unwelded surface between them. The machine referred to automatically feeds to the jaws stamped sheet metal pulleys or sheaves in two pieces, one of which is bossed at the points of welding.

The portable equipment, Fig. 2, is employed for welding copper, brass or aluminum wire to obtain continuous lengths. The equipment can be used at any point where a plug and socket connection can be made. A reactive coil, to cut down the current for small sizes of wire, with cutout switch, is mounted on the base of a truck while the welder, automatic breakswitch and another switch are located on the table. In welding small sizes, like No. 16 B. & S. gauge, the heat comes so quickly, in a fraction of a second, that the breakswitch and then the kniveswitch are closed. The current crossing the joint, the brakeswitch

automatically opens and the weld is completed. When welding above No. 6 wire the reactive coil is cut out.

The wire fabric loom, Fig. 3, is designed to weld wire fabric such as fencing automatically. The width of the meshes is regulated by the adjustment of the skeleton carrier wheels at the top of the machine, wire is fed in through a straightener and is cut off for the warp, after which it is held by fingers in contact with the woof.

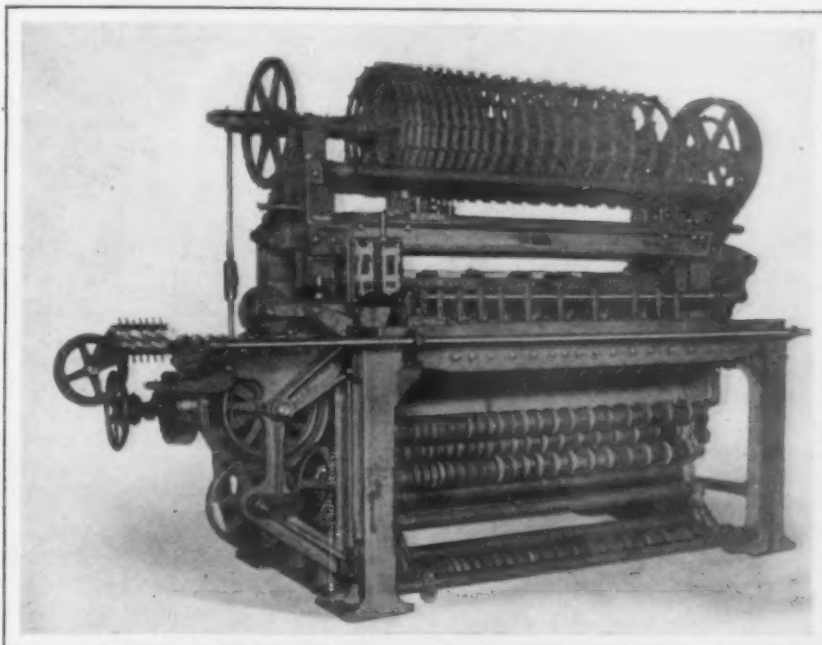


Fig. 3.—A Wire Fabric Loom

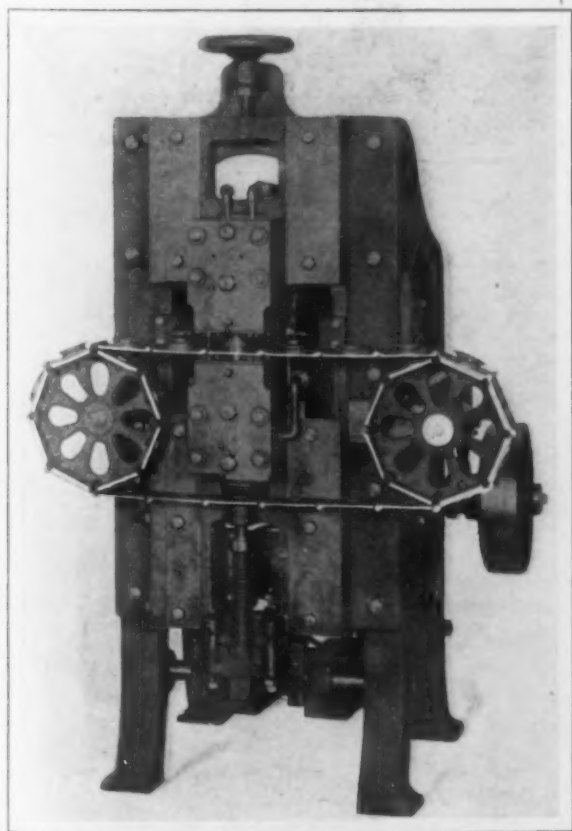


Fig. 1.—New Form of Spot Welder



Fig. 2.—Portable Equipment for Welding Wire

Surface Quality in Steel

A relation between the composition of steel and its adaptability to such finishes as are demanded in certain lines of service is suggested by the following from Metallurgical and Chemical Engineering:

"We have long been accustomed to think of quality in steel almost wholly in terms of elastic limit, yield point, ductility, hardness, resistance to fatigue, etc., while more lately we have had to consider, for certain classes of steel, magnetic permeability, hysteresis, conductivity, etc., and for certain other classes of steel the question of corrodibility has been emphasized by some producers.

"A somewhat new factor has been looming large of late, on account of the extremely rapid increase in the use of steel sheets for metal furniture and for various automobile parts, particularly bodies and hoods. These sheets are required to take a high degree of finish. Various finishes are furnished by the sheet mills, leaving the surface in condition to take such coating as the fabricator desires to apply. It has been found that these so-called 'finishes' given by the mill are not to be regarded purely as treatment superficial or entirely subsequent to the manufacture of the steel sheet. The character of the steel itself is found to have much to do with success in applying the 'finishes.' There is practically no literature on the subject.

"The mills which have developed these finishes most successfully have not taken the public into their confidence. They have been learning rapidly, and the information has not had time to percolate, but it has become perfectly clear that to our researches as to how to make steel strong, ductile or hard as the case may be, qualities which are purely of cross-section, there must be added study as to how to make steel such that it will present, or yield itself to being given, a particular character of surface. This is practically a new field in the adaptation of steel to commercial use. The first man who modified the character of steel in order to contribute to surface finish has not come forward to claim the honor, preferring to endeavor to maintain a commercial secret, but we have reason to believe that what he did was done only very recently."

The Simmons Mfg. Company's Safety Plans

A plan of increasing safety and promoting efficiency by the expenditure of approximately \$100,000 during the first year of its operation was announced at a dinner given by the Simmons Mfg. Company, Kenosha, Wis., one of the largest manufacturers of brass and iron beds in America, to 80 or more factory superintendents and foremen. Otto Rudd, general superintendent, acted as toastmaster and among the speakers was C. W. Price, safety expert for the Industrial Commission of Wisconsin, and formerly in charge of safety work for the McCormick works of the International Harvester Company. President Z. G. Simmons made an address in which the safety plan was announced and outlined. A board of efficiency selected from the list of factory superintendents and foremen, with Superintendent Rudd as chairman, will have charge of the distribution of the fund. A prize of \$2500 will be divided among the two foremen who show the greatest improvement in safety and efficiency during 1913. The Simmons plan is regarded as one of the most comprehensive and liberal ever undertaken by a Wisconsin industrial plant.

The fortnightly bulletin of the American Railway Association showed a net surplus of 37,260 cars on the railroads of the United States and Canada on February 1, or an increase of 8731 in the second half of January. The last report of a net shortage was on December 14, when it was 34,392.

A Mechanical Cylinder Lubricator

A New and Interesting Force Feed Device for Use on Engines

For the lubrication of engine cylinders by force feed, the Lunkenheimer Company, Cincinnati, Ohio, has developed a new type of mechanical oil pump. It possesses a number of interesting features, among which may be mentioned the accessibility of the parts, regulation of the feed with provision for supplying a greater amount of oil than usual in case of emergency, ease of filling and a sight feed for every outlet. Three sectional elevations

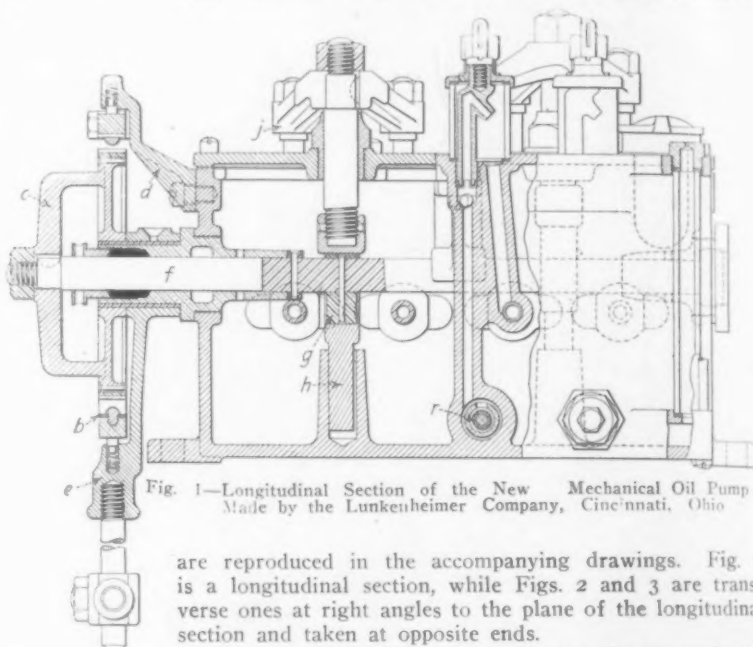


Fig. 1—Longitudinal Section of the New Mechanical Oil Pump Made by the Lunkenheimer Company, Cincinnati, Ohio

are reproduced in the accompanying drawings. Fig. 1 is a longitudinal section, while Figs. 2 and 3 are transverse ones at right angles to the plane of the longitudinal section and taken at opposite ends.

The coupling *a*, Fig. 2, is attached to the eccentric rod or other moving part of the engine and the driving mechanism is of the ratchet type. The ratchet plate *b*, Fig. 1, engages with teeth on the driving wheel *c* at each forward stroke. An arm, *d*, carrying a spring-actuated pawl acts as a brake for the driving wheel, holding it to the degree of motion imparted by the ratchet arm *e* and also preventing the wheel from being turned backward. The wheel is keyed to the shaft *f*, Figs. 1, 2 and 3, the motion of which it controls, and fastened to the shaft are case hardened steel eccentrics *g*, Figs. 1 and 2, which operate in yokes *h*. These yokes are connected with the plunger plates *j*, Figs. 1, 2 and 3, which move up and down with the revolution of the eccentrics. Attached to these plates are two plungers, one shown at *k*, Fig. 2, acting to force the oil through the sight feed *l*, while the other *m*, Fig. 3, forces the oil to the engine cylinders. On

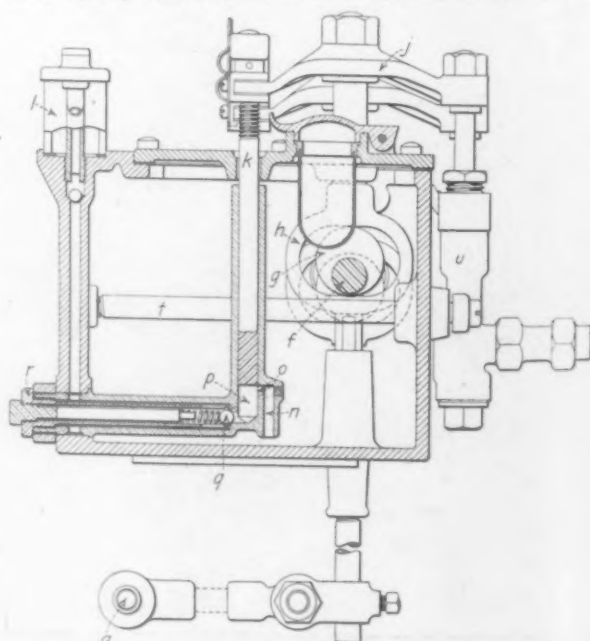


Fig. 2—A Transverse Section of the Pump

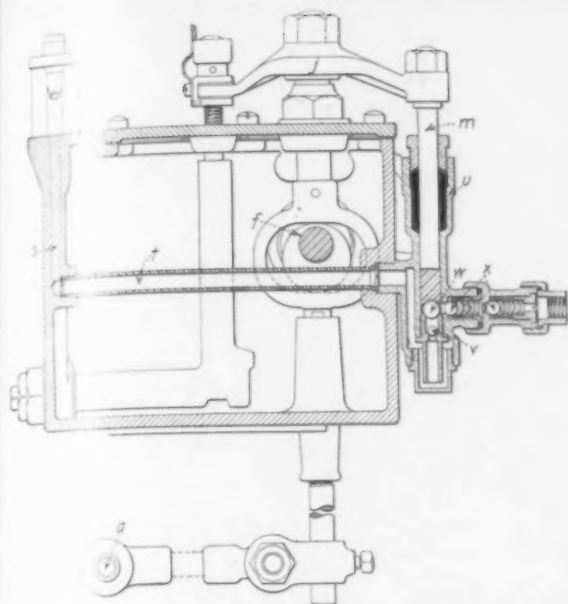


Fig. 3—Another Transverse Section Taken at the Opposite End

the upstroke of the piston *k*, Fig. 2, the oil is drawn into the passage *u*, through the drill hole *o* into the bottom of the piston cylinder *p*. On the downstroke, the piston covers the drill hole, and the oil in the pocket *p* is forced past the check ball *q*, around the passage *r*, Figs. 1 and 2, past the check ball at the top, and then through the sight feed. When the plunger moves upward both check balls in the passage leading to the sight feed close, thus preventing the oil from falling back into the reservoir. The oil from the sight feed flows down the passage *s*, Fig. 3, through the tube *t*, into the cylinder casing *u*, Figs. 2 and 3, from whence, on the upstroke of the piston, it is drawn past the check balls *v* and *w*, Fig. 3, into the cylinder. On the downstroke of this piston the balls close and the oil entrapped above them is forced past the outlet check balls *x* into the engine cylinder.

For this type of pump a high efficiency is claimed, because of the positive, steady flow of the oil, which is not in any predetermined amount. This arrangement secures an economy in the amount of lubricant used, since no oil is wasted, it being fed only when the engine is running and the feed is regulated in accordance with the speed.

A Hydraulic Bulldozer for Heavy Forgings

For use in the manufacture of heavy motor truck axles, the Watson-Stillman Company, 190 Fulton street, New York City, has recently designed a hydraulic bulldozer. Although this is the special field for which the machine is intended, at the same time it can be employed for upsetting or shaping heavy forgings for die press work. Among the special features of the bulldozer are the arrangement

of the three rams all of which are connected to one head so as to permit the number of rams in use to be varied according to the pressure required; the use of positive stops to limit the stroke of the ram and the providing of a cylinder to return the moving cross-beam to its initial position as soon as the rams are released.

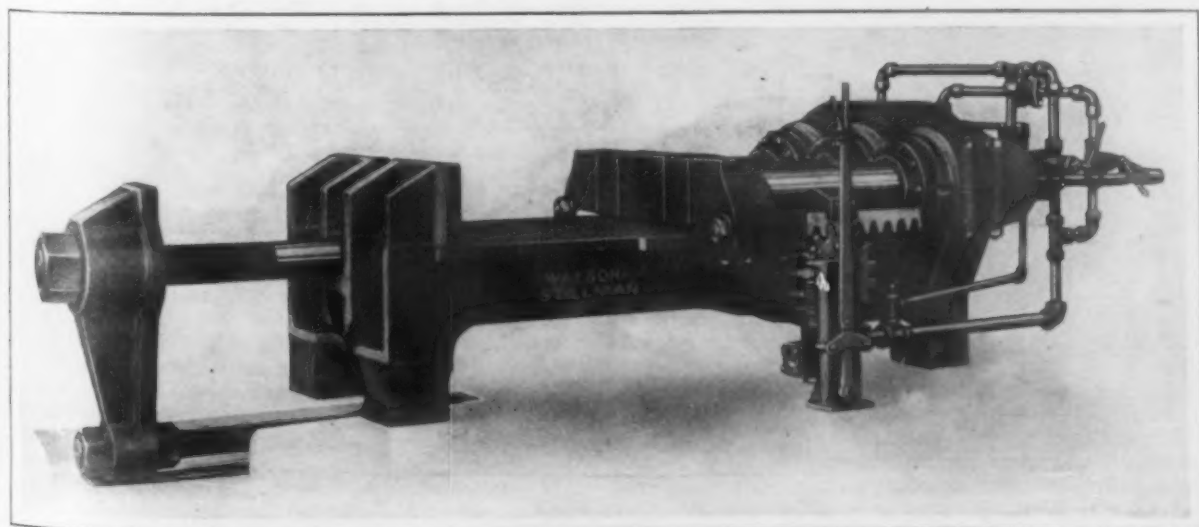
If it is desired to upset or split a round or square steel bar at one end and then shape it to the required form, it is put on the bedplate with the end which is not to be upset against the heavy upright beam at the extreme left. There is a slot in the rigid cross-beam between the two middle stiffening ribs, which is large enough to handle almost any size of bar or shape up to or beyond the full capacity of the machine. This slot, however, is not clearly shown in the accompanying engraving. The upright stop at the left is then adjusted to its proper position by the nuts on the two horizontal rods, the correct position of this beam being determined by the length of bar that must project onto the bedplate clear of the face of the rigid cross-beam.

A forming die, cutter, or whatever is required to give the bar its initial cut or shape is attached to the moving cross-beam at the right, the four vertical T-slots providing ample means for attaching the great variety of dies. To guide or shape the operation, a forming or holding die is also placed against the fixed cross-beam and where many pieces of the same size are to be formed the die is not removed until all are ready for another operation, if that is required.

The three rams, which are all connected to the one cross-beam, are arranged to permit one, two or all three to be used, depending upon the pressure required. When the required capacity is under 56 tons only the middle ram is operated, and by substituting the outside rams this figure is increased to 127 tons. When all three cylinders are in use at the one time, the capacity is 200 tons. The different cylinders are cut in and out of service by the stop valves in the piping at the back. The vertical latch lever which operates a 2-in. balanced two-spindle valve completely controls the press, and a 5-in. pullback cylinder, which is not shown, is continually under pressure to return the moving cross-beam to its initial position as soon as the rams are released. Positive stops, which are strong enough to take up the full pressure, limit the stroke of the rams to 15 in. and serve as safety devices in preventing excessive upsetting on certain forgings. An equalizing device, consisting of two racks and pinions, one of which is shown in the engraving, is provided to insure parallel motion when eccentric loads are placed on the moving cross-beams.

The following table gives the principal dimensions and specifications of the bulldozer:

Width of bed plate, in.	44
Maximum opening between moving and rigid cross-beams, in. ...	48
Maximum opening between moving cross-beam and adjustable stop, in.	90
Maximum length of moving cross-beam, in.	48
Diameter of rams, in.	11
Stroke, in.	15
Maximum liquid pressure, per square in., lb.	1500
Diameter of horizontal extension bolt, in.	6
Weight, lb.	20,000



A New Hydraulic Bulldozer for Upsetting and Shaping Heavy Forgings for Die Press Work Built by the Watson-Stillman Company, New York City

Ground Space in Foundries

German Plants Turning Out Gray Iron Castings Use More Than Is Required in This Country

In Stahl und Eisen for December 26, 1912, is a very interesting paper on the ground space requirements of modern gray iron foundries by Chief Engineer E. Munk of Hamburg. There are at present no clear and well defined views as to the necessary ground space for various classes of foundries, and the author set out to collect data on typical German, Austrian, and Belgian foundries. American foundries are not included because if they are investigated very different dimensions are found, usually much smaller than for German foundries. This is due to the prevalent standardized methods in this country whereby the same or similar articles are made continuously, and also because of special operating arrange-

able in the case of foundries for small castings. The McCormick plant in Chicago uses 62.4 sq. ft. and the Harvester Company as a whole, 258 to 280 sq. ft. per 100 tons yearly output. Compared with this the foundry of the Gebr. Sulzer in Winterthur, Switzerland, which turns out similar work, has 646 sq. ft., and that of Waagner, Biro and Kurz in Vienna has, on the average, the same amount per 100 tons.

The writer divides foundries into four classes, in some cases subdividing these classes, and obtains the results given in the accompanying table per metric ton (2204.6 lb.) of yearly output. They are based on the actual figures of many plants where operation goes on quietly and smoothly, where almost every part fills its intended purpose adequately, and which are either modern or have been rebuilt according to experience gained during many years of work.

G. B. W.

Ground Space Requirements in Foundries per Metric Ton of Yearly Output

Kind of Foundry	Molding Floor in Sq. Ft.		Cleaning Floor		Melting Plant		Core Room		Drying Chambers		Land Preparation		Pattern Shops, Carpenter Shops and Smithy		Laboratories, Wash Rooms, Toilets, Raw Material and Stores Rooms, Yard and Office		Total Requirements in Sq. Ft. About
	Separate Values	Average Values	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	Per Cent of Molding Floor	In Sq. Ft.	
1. Foundries for the heaviest machine castings. For rolling mill engines, fly wheels, presses, shears, etc.	2.69 to 3.23	3.02	25 to 30	0.75 to 0.97	8	0.21	20 to 25	0.60 to 0.75	14 to 20	0.43 to 0.60	5 to 6	0.15 to 0.18	5	0.15	At least 150	4.52	9.47 to 10.35
2. Foundries for average weight and heavy complicated castings:																	
(a) Foundries for machine tool factories, and plants that require mostly simple average weight castings.	5.38 to 6.46	5.92	15 to 22	0.86 to 1.29	8	0.43	10 to 15	0.59 to 0.86	8 to 10	0.47 to 0.59	5 to 6	0.29 to 0.35	5	0.33	At least 150	8.83	17.22 to 19.16
(b) Foundries for average weight complicated castings. Locomotive, steam engine, wood working machine plants. Parts for pumps, compressors, etc.	8.61 to 9.15	8.93	18 to 22	1.61 to 1.94	8	0.70	15 to 20	1.29 to 1.79	14 to 20	1.29 to 1.72	5 to 6	0.43 to 0.54	5	0.43	At least 150	13.02	27.34 to 29.28
3. Foundries for agricultural machinery, textile machinery, printing or paper machinery plants	8.61 to 9.69	9.15	18 to 22	1.61 to 2.01	7	0.65	10 to 15	0.97 to 1.37	8 to 10	0.75 to 0.91	5 to 6	0.45 to 0.54	5	0.45	At least 100	9.15	22.60 to 24.75
4. Foundries for small castings:																	
(a) For light machine parts, etc. (mostly bench work)	11.84 to 12.91	12.38	13 to 18	1.61 to 2.26	7	0.86	10 to 15	1.18 to 1.83	8 to 10	0.97 to 1.18	7 to 8	0.86 to 0.97	10 to 15	1.24 to 1.83	At least 100	12.38	30.89 to 34.23
(b) Machine molding for ordinary quantity production	5.92 to 6.46	6.24	13 to 18	0.86 to 1.08	7	0.43	10 to 15	0.62 to 0.94	8 to 10	0.49 to 0.62	7 to 8	0.43 to 0.49	15 to 25	0.94 to 1.57	At least 100	6.24	15.93 to 18.08
(c) For cooking utensils and sanitary ware . . . . .	.....	8.07	16 to 18	1.29 to 1.51	7	0.54	10 to 15	0.81 to 1.18	8 to 10	0.65 to 0.81	7 to 8	0.54 to 0.65	10 to 15	0.81 to 1.21	At least 100	8.07	20.72 to 23.14
(d) For waste pipes, joints, etc. . . . .	.....	8.07	20 to 30	1.61 to 2.37	7	0.54	25 to 35	2.01 to 2.80	8 to 10	0.65 to 0.81	7 to 8	0.54 to 0.65	10 to 15	0.81 to 1.21	At least 100	8.07	22.28 to 24.54

ments. For instance, conditions are much more favorable in those large American foundries where the cupolas are kept running the whole day and the finished molds are brought to them on a traveling table; then after being poured and shaken out the empty flasks are returned to the molder. In such cases the necessary space is greatly decreased. The large foundry of a Chicago machinery company, which produces mostly heavy castings, requires from 43 to 134.5 sq. ft. of molding floor per 100 tons yearly output, depending on the size and weight of the castings. The foundry of the Nürnberg plant of the Maschinenfabrik Augsburg-Nürnberg A. G., which is remarkably well designed, utilized and operated, requires 323 sq. ft. per 100 tons. The plant of the Schenectady Locomotive Works requires in its foundries 172 to 237 sq. ft. per 100 tons yearly output. The large foundry of the Sächsischen Maschinenfabrik in Chemnitz has 807 sq. ft. Both works produce locomotives, steam engines and heavy machinery. The difference is particularly notice-

American Blower Company's Sales Convention

The branch office managers and selling engineers of the American Blower Company met for their annual convention at the Hotel Pontchartrain, Detroit, January 23, 24 and 25. Enthusiasm with regard to the business of the past year as well as prospects for the future was evident throughout all of the sessions. Questions relating to engineering, salesmanship, administration, works management and production were discussed at considerable length.

That the company is well known in its home city is shown by a recent incident. A manufacturer in Virginia had occasion to inquire into the matter of exhaust fans. He remembered that there was a manufacturer of such machines in Detroit, but did not recall the name, consequently addressed his letter, "Manufacturers of Blowers for Planing Mills, Detroit, Mich.," which letter was promptly delivered at the office of the American Blower Company.

Harveyized Armor Plate Royalty

The Government Must Pay Royalty
to the Harvey Steel Company

The Supreme Court of the United States has affirmed a finding of the Court of Claims which allowed a judgment against the United States to the Harvey Steel Company for \$123,467.23. This was the amount of royalty found to be due to the Harvey Steel Company under a contract dated April 12, 1893, to pay royalty on all armor plate treated by the Harvey process and used by the United States. The armor plate under which the royalty in question was allowed was manufactured for the United States under four contracts with the Midvale Steel Company. The Court of Claims permitted the Midvale Steel Company for the protection of its interests under the contracts to intervene, and also to appeal. Following are excerpts from the decision:

"The method described in the patent for 'producing a decrementally hardened tenacious armor plate' consisted in inclosing a low steel plate between a mass of noncarbonaceous material on one side and a mass of granular carbonaceous material firmly packed upon the other side contained in a compartment formed within the heating chamber of a suitable furnace,' etc. The noncarbonaceous material actually used in the Harvey process consisted of sand packed at the back of the plate to protect it from the carbonaceous material and excessive heat, of which the Government was advised by the patentee by an exhibition of the process with the use of sand prior to the contract of April 12, 1893. The use of sand was gradually discontinued, because the same result could be accomplished without it, and some of the companies manufacturing plates were so advised late in 1893. Since 1904 no sand or other noncarbonaceous material has been used by the Carnegie and Bethlehem companies manufacturing armor plate.

The Midvale Steel Company's Process

"The process used by the Midvale Steel Company in the manufacture and production of armor plate was as follows: The plate to be carbonized was mounted, face up, on brick piers about 18 in. high, resting on the car bottom, about 1 ft. apart. A row of bricks, two high, was then placed around the plate and the carbonizing material was put inside of these bricks on the face of the plate and raised about 3/4 in. above the bricks. Mortar was edged up on the second bricks. Then the second plate was placed on the carbonizing material, face down. The plates were then run into the furnace and the fire started. The brick box containing the carbonaceous material prevented it from reaching the back and sides of the plates, thus accomplishing the same result as with the sand which was used to protect the back of the plate from the carbonaceous material and excessive heat as aforesaid. The contention of the appellants on this branch of the case was thus stated by the court below in its opinion:

In the present case the contention of the defendants and the intervenor is that in the hardening or Harvey process referred to, one of the elements required was the use of sand, a noncarbonaceous material packed in the back of the plates, and that if not so used it cannot be contended that the Harvey process was applied by the Midvale Steel Company in the process which it used in hardening the plates under its several contracts with the United States, though in other respects it concedes that the Harvey process was substantially used. Its contention is that it did not use sand. That is to say, that it accomplished the same result without as had been accomplished with sand, and it may be added that the same result was accomplished without the use of any noncarbonaceous material in the back of the plates by confining the carbonaceous material within the brick box, as set forth in the findings.

"In view of the construction given to the contract of 1893 by the previous decision, we are of opinion that the court below did not err in deciding as it did that the circumstance that sand was used in the back of the plates in the various tests made by the Government to which reference has been made and was also employed in the treatment of the armor plate which was the subject of the suit decided in 196 U. S., while in the treatment of the armor plate involved in this suit neither sand nor any other noncarbonaceous material was packed on the side of the plate which was not to be carbonized, did not entitle the United States to claim that the Harvey process of the contract of 1893 was not used. As said by the court below, the Government received all it had bargained for, since it was not

only entitled by the contract to a disclosure of the inventor's process but to his instructions and assistance in the practical application of the patent, and was at liberty to use the process, little or much, in whole or in part.

"The unsoundness of the remaining contention becomes apparent from its mere statement. The proposition is that even although the armor plate made for the United States by the Midvale Steel Company was hardened by the Harvey process, the obligation to pay royalty as to such armor does not exist because the United States had not by its contracts with the Midvale Company specifically required that company to use the Harvey process. But under the terms of two of the contracts with the Midvale Company that company was permitted to use the Harvey process if desired, while under the other contracts the process used was required to be satisfactory to the Navy Department, and under all the contracts the United States had the right to inspect the process used. Under the contract of April 12, 1893, the right was conferred upon the United States to use and employ the aforesaid Harvey process in the treatment of armor plates for vessels which have been since July 18, 1892, or which may hereafter be, authorized by Congress, and to use and employ armor plates for such vessels manufactured according to such process, paying therefor to the party of the first part the royalty of one-half of one cent per pound of the finished plate. We think the plain meaning of the contract was that the Government should pay royalty when it used armor plate treated according to the Harvey process of the contract."

The Philadelphia Foundrymen's Association

"Pneumatic Tools for the Foundry and How to Use Them" was the topic for discussion at the February meeting of the Philadelphia Foundrymen's Association, held at the Hotel Walton on the evening of February 5. The subject was presented by William A. Armstrong, Ingersoll-Rand Company, New York City and Phillipsburg, N. J. While his address was mainly confined to the paper he presented before the Newark Foundrymen's Association at its January meeting and printed in *The Iron Age* of January 16, a number of points in connection with various types of air compressors and the use of compressed air in connection with pneumatic chipping hammers, drills, air hoists, sand blast apparatus, etc., were taken up in detail, as well as illustrated by numerous lantern slides.

At the March meeting of the association, A. G. Warren, J. W. Paxson Company, Philadelphia, will present a paper on "Sand Blast and Sand Blast Apparatus."

The Sims Company, Erie, Pa., maker of hot water heaters, has commenced the erection of a new plant, 100 x 200 ft., of brick and steel construction, in the eastern part of the city, adjoining the Nickel Plate Railroad tracks. The company expects to be located in its new plant May 1 and will then be able to largely increase its output. After it moves into the new quarters this company will manufacture its own steel shells for heaters, which are now made outside. At the same time the company will begin the manufacture of water heating garbage burners for apartment houses and small hotels. Among the recent installations of this company are two 1200 h.p. open heaters for the Erie Railroad Company and two large closed type heaters for the St. Louis plant of the Aluminum Company.

The Bury Compressor Company, Erie, Pa., has shipped a 1600-ft. belt driven 3-cylinder compound variable volume air compressor to the Michigan plant of the M. Rumely Company and has installed a 1400-ft. compressor in the plant of the Strong Steel Foundry Company, Buffalo, N. Y. This company is also building a 1200-ft. compressor for the Fort Pitt Malleable Iron Works, Pittsburgh, Pa., and has received an order for four 2-cylinder low pressure variable volume compressors from the Owens Eastern Glass Bottle Company.

The Rock River Machine Company, Janesville, Wis., manufacturer of punches and shears, has appointed the Berger & Carter Company, San Francisco, its special representative for the Pacific Coast.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

An Interesting Ash Handling Plant

**Inclined Skip Hoist Delivering from
Boiler House to Elevated Bunker**

An ash handling plant has just been installed by the Cleveland Electric Illuminating Company, Cleveland, Ohio, that is of interest because of its size, the distance that it is necessary to elevate the ashes and the fact that a new type of hoist was designed to meet the conditions. This company recently built a large new plant for furnishing electricity for lighting and power, this plant being located on the shore of Lake Erie close to the water's edge in the eastern part of the city.

As the site is at the bottom of the steep bank below the railroad track level, the tracks on which the ash cars run from the boilers are about 75 ft. below the railroad tracks. Accordingly it was necessary to provide a handling plant that would elevate the ashes from nearly the lake level to a sufficient height to be dumped into cars at the level above and about 200 ft. inshore from the plant. For this purpose the automatic counter balanced skip hoist illustrated in Fig. 1 was designed and built by the C. O. Bartlett & Snow Company, Cleveland, this hoist having sufficient capacity to handle several hundred tons of ashes per day.

Ashes are taken from hoppers underneath the furnaces of the boilers by electrically-operated side-dumping ash cars. From these cars they are dumped directly through chutes into the skip of the skip hoist. This hoist is equipped with two skip cars each having a capacity of about 200 cu. ft., the cars being operated by an electric hoisting mechanism controlled by a limit switch and operated by a push button. The arrangement is such that a car when loaded is raised up an incline at the speed of 200 ft. per minute and automatically dumped into a bin of the suspension type. When the car reaches the top of the skip it is automatically retarded and stopped at the proper point. While the loaded car is going up the incline the other car is being lowered to the boiler house to receive another load, as shown in Fig. 1. The top of the receiving bin is approximately 50 ft. above the railroad track level, so that the total elevation of the ashes required is about 125 ft. The inclined railway is of the lattice girder type. The automatic dumping rails at the head of the incline are of heavy construction carried on a large flat diaphragm.

The suspension type bin illustrated in Fig. 2 is constructed of parabolic bars lined with concrete carried on Ferro-inclave and is supported on a heavy steel frame-



Fig. 1—The Counter Balanced Skipway and Skip Installed at the Powerhouse of the Cleveland Electric Illuminating Company by the C. O. Bartlett & Snow Company, Cleveland, Ohio, In the Engraving One Skip Is Going Up with a Load and the Other Is Descending Empty



Fig. 2—The Upper End of the Skipway and the Concrete Bin Into Which the Ashes Are Dumped

work. The bottom of the bin is equipped with two large gates that are opened and closed simultaneously or independently by an electric motor. The nozzles of these gates are fitted with steam coils and jets to prevent the ashes from freezing in cold weather. Underneath the bin are two tracks as shown in the illustration. The bin is provided with chutes for dumping the ashes into standard gondola cars on either track.

The hoisting engine together with its automatic control is placed in a house on the ground level beside the bin, thereby inclosing the principal wearing parts of the operating mechanism so as to prevent the wearing action of the dust from the ashes. The whole construction of the equipment is such that the only parts coming in contact with the ashes and subject to corrosion are the skips themselves. This protection insures long life for the equipment and freedom from repairs.

Fitting Ball Bearings

In a paper entitled "The Application of Ball Bearings to Engineering," read by George W. Goodchild before the University of Liverpool Engineering Society, it was pointed out that in fitting a ball bearing the inner ring should be driven tight on the shaft, while the outer is a push fit in the housing, and should be allowed some side play. Before mounting, the bearing should be allowed to lie in a bath of oil heated to about 104 deg. F., and then driven on the shaft, which should be a shade larger than the bore of the bearing, by a few good blows directed on the inner ring, carefully avoiding hitting the balls or outer race. This is particularly essential if the loads vary considerably, and when the bearing is subject to constant and considerable vibration, such as in crank shafts and rolling mills. It is also necessary for machines running at high speeds, such as electric motors, ventilators, woodworking machines, etc. It is very desirable that the shaft should be ground where it is proposed to fit a ball bearing; furthermore, the inner race should be clamped tightly on the open side, and it is essential that nuts or other parts holding the inner race in position should not come into touch with either cage or balls.

R. Ardelt & Söhne, G.M.B.H., machine manufacturers and civil engineers, announce that for the sake of simplicity their firm has been changed into the Ardeltwerke Company, Ltd., to be addressed as heretofore at Eberswalde, near Berlin, Germany.

The Tofo Iron Mines in Coquimbo, Chile

Character and Extent of the Bethlehem Steel Company Deposits and Present Methods of Working and Shipping

The acquisition of the Tofo iron mines in Chile by the Bethlehem Steel Company, of which mention was made in *The Iron Age* of January 23, gives interest to an extract from the paper by Charles Vattier, delegate from the Chilean government, presented at the October, 1912, meeting of the Iron and Steel Institute, held at Leeds, England. Mr. Vattier's paper also gave some account of the works of the Société des Hauts Fourneaux Forges et Aciéries du Chile, which operated a blast furnace at Corral and shipped in 1911 some 7000 tons of pig iron to Great Britain. The furnace and connected plant were built at an outlay of \$3,000,000 under a guaranty by the Chilean government of 5 per cent. interest above operating expenses. The cost of pig iron was so great, however, that late in 1911 operation of the furnace was discontinued. Ore was obtained from the Tofo mines, owned by the same French interests which operated the blast furnace and from which the Bethlehem purchase was made.

Analyses of the Tofo ores, as made by Ridley, of London, show as high as 68.78 per cent. metallic iron, 0.027 phosphorus, a trace of sulphur, 0.50 silica, 0.36 lime, 1.08 alumina, and 0.57 combined moisture. We quote from the portion of Mr. Vattier's paper relating to the ores of the Province of Coquimbo, of which the port is Coquimbo, 190 miles north of Valparaíso:

The Iron Mines of Tofo

These iron mines, which may be regarded, both as to quality and quantity, as among the most important in Chile, are situated in the province Coquimbo, in the Department of Serena, about 4 miles to the west of the well-known copper-mining district of Higuera and 5 miles to the east of Cruz Grande Bay.

About seven years ago the author obtained from the successors of Messrs. Cerda, Vicuna & Muñoz the sale of the whole of the concessions to a representative of the Société des Hauts Fourneaux, Forges et Aciéries du Chile, a company which is at the present moment in absolute possession of the whole of this important mining center. The actual area of these concessions is 215 acres.

Hitherto this deposit has only been proved by some survey shafts, by a cutting of 32 ft. in depth on the ridge and by a few cross cuts, but its incontestable sedimentary origin justifies the expectation that at greater depths and at the center of the mines the same ores will be found as at the surface. The engineers of the company referred to endeavored to ascertain the probable cubical capacity of the deposits. Taking the density as 4.0 only, the probable amounts to 69,460,117 tons of ore is arrived at. Thus the presence of well over 60,000,000 tons of ore containing over 68 per cent. of iron and less than 0.025 per cent. of phosphorus may be absolutely assumed. Assuming that the same conditions of abundance and high percentage continue, without variation in depth, it may be foreseen that for every 100 meters in depth there will be 35,000,000 tons of ore below the 600 line, and thus, taking into further consideration the various other outcrops which appear in the land in this concession, it would not be an exaggeration to assume the existence of at least 145,000,000 tons, an amount which the author has recorded in other publications.

The minerals consist of oxides of several varieties, such as magnetites, oligists and hematites, with here and there micaceous oxides, but it is the massive magnetites and the hematites similar to those of Brazil which are found in the greatest abundance. The engineers of the company took a large number of samples from the surface, from the survey shafts and from the cuttings made for the installation of the aerial ropeway, and along various directions in the deposit. Samples were also taken from the boulders of ore strewn on the surface. In regard to the latter, the average percentages were: Iron, over 68 per cent.; phosphorus, about 0.03 per cent., with hardly any traces of sulphur or copper.

With regard to the phosphorus which was contained in the apatite (phosphate of calcium), often visible to the naked eye in the samples, it was observed that it was in the upper portion of the peaks and in the outcrops that it was most abundant. A complete analysis of a large number of samples yielded the following results: Peroxide of iron, 83.86 per cent.; protoxide of iron, 12.60 per cent.; alumina, 0.70 per cent.; silica, 1.35 per cent.; combined water, 0.99 per cent.; lime, 0.18 per cent.; magnesium, traces; manganese oxide, 0.20 per cent.; sulphuric acid, 0.05 per cent.; phosphoric acid, 0.03 per cent.; which corresponds to: Iron, 68.50 per cent.; sulphur, 0.022 per cent.; phosphorus, 0.013 per cent.; original moisture, 0.39 per cent.

The methods of working are exceedingly simple, and can be effected by open-cut quarrying, proceeding later, as in Sweden and Norway, by terrace workings of 30 to 60 ft. in height.

Taking the salary of miners at $3\frac{1}{2}$ piastres in paper money of the Chilean currency (1 paper piastre being equal to 0.87s.), it may be assumed that the total cost of extracting and breaking up the blocks will not exceed 3 to $3\frac{1}{2}$ piastres a ton, and even this price might be reduced.

Transport and Shipment

As long as the distance does not exceed about 300 yd. the broken ore, or the ore strewn on the surface, can be transported by a Decauville railroad to the central station of an aerial ropeway, and subsequently by an aerial ropeway for a distance of about $4\frac{1}{2}$ miles from this mining center to the Bay of Cruz Grande. Each bucket holds, on an average, about half a ton. The difference in the level between the mine and the Bay of Cruz Grande is 2295 ft., which allows the buckets to descend by gravity and furnishes valuable surplus power.

This aerial ropeway has a present capacity of 40 tons per hour. For loading there has been installed in the Bay of Cruz Grande, which is well protected from the northern and southern winds but is open towards the west, a quay with a bridge 37 yd. in length [shown on p. 249 of *The Iron Age* of January 23, 1913] which enables vessels to approach below the quay and to receive their cargo direct by means of a hopper and an iron chute. Loading may be effected at the rate of 1000 tons per diem. Arrangements are at present being made to reinforce the aerial ropeway so as to double its capacity and to prolong it for 35 yards further along the quay so as to permit vessels of still greater tonnage to lay alongside. The capacity of the aerial ropeway can thus be augmented to 80 tons per hour, loading into storage bins of 20,000 tons capacity, connected by a secondary ropeway of 160 yd. in length, which will allow of 300 tons of ore to be charged per hour. Arrangements are also provided so as to stock, in case of need 200,000 tons by the seaside, whence loading may be carried out by the same secondary ropeway as mentioned above.

It is believed possible to load 250,000 tons of ore annually; and later on, by means of further installations, to increase this exportation to 1,000,000 tons of ore annually. At the present time the iron ores obtained from Tofo by the Société des Hauts Fourneaux, Forges et Aciéries du Chile are employed to supply not only the metallurgical works at Corral, to which they are transported in special vessels, but are intended for export, and several boatloads have been sent already, with excellent results, to Great Britain and to Germany. Important contracts are in course of arrangement. There is little doubt that the export trade will increase, not only with Europe, but also with Japan and the United States, particularly in 1915, when the Panama Canal will be opened. Without definitely estimating the cost price, it may be said that the exceptionally favorable conditions of the Tofo mines, from the point of view of their easy exploitation and their proximity to the seacoast, will allow of loading ore at an exceedingly low price.

The American Can Company's Year

An excellent showing is made by the American Can Company in its report for the year ended December 31, 1912. The income account for the year compares as follows with 1911:

	1912	1911
Earnings	\$7,522,932	\$5,416,339
Depreciation	500,000	2,500,000
Preferred dividends	(5 3/4%) 2,370,915	(5) 2,061,665
Improvements, purchase of patents, etc..	483,886	.....
Balance, surplus	\$4,168,131	\$854,674

The balance sheet for the close of both years is as follows:

Assets		1912	1911
Plants, real estate, patents, etc.....		\$70,857,873	\$71,233,481
New construction		11,019,356	8,907,618
Other investment items.....		72,538	337,238
Cash		4,148,684	3,539,000
Accounts and bills received.....		3,242,901	3,315,204
Merchandise inventory		9,121,709	5,785,218
Total		\$98,463,062	\$93,119,759
Liabilities		1912	1911
Common stock		\$41,233,300	\$41,233,300
Preferred stock		41,233,300	41,233,300
Accounts payable		2,270,868	1,476,310
Dividends January 1.....		824,666	515,416
Contingent funds		1,057,058	985,695
Surplus		11,843,870	7,675,738
Total		\$98,463,062	\$93,119,759

In his accompanying remarks President F. S. Wheeler says:

"The past year showed an improvement both in earnings and volume of business. There has been an increasing demand for packages, both plain and lithographed, for use in the general lines of trade to hold oils, paints, grease, blacking, tobacco, coffee, tea, cereals, syrups, etc., and in the field of chemicals, drugs, talcum powders, etc. Your management has been diligent in devising and installing improved methods and equipment, resulting in a generally better quality of product. The growing popularity of the sanitary can for food products has made it necessary to provide additional facilities for manufacture and storage and to construct and furnish to customers machines for sealing and closing such cans. To meet these conditions and to provide for growing demands generally, there has been expended during the past year \$1,767,022 for new construction, the principal items of which are at Toledo, Baltimore, Philadelphia, Portland, Ore., Brooklyn, Fairport, N. Y., San José, Cal., San Francisco, Indianapolis, Joliet, Maywood, Ill., New Orleans and Niagara Falls, Ont.

"The plants have been fully maintained and minor betterments and improvements have been charged to operating expense. All merchandise has been valued in the statement at cost, or at market value when less than cost, and all doubtful receivable accounts have been written off. All liabilities, actual or contingent, have been included. The showing thus is conservative. The working capital December 31 amounted to \$13,417,760, an increase of \$2,770,065.

"In forecasting the coming year, the outlook appears satisfactory and promises returns that will compare favorably with the past year. Contracts already made and other business in reasonable prospect justify this expectation. The practice of packing commodities in small containers, representing individual units of consumption, is steadily increasing, and new articles are being added to the list. This feature, coupled with the steady growth of the country, insures a reliable market for your products. Competition is keen and aggressive, but with plants located well geographically, equipped with the most modern machinery (chiefly built in our own shops from designs of our own experts), and with our capable organization of trained men, the company may reasonably rely on a continuance of large and growing business.

"The fiber packing department has shown a gratifying growth during the past year, and greater capacity is being provided to care for increased business in sight. Packages of improved quality have been devised, which will enlarge the field previously open to fiber containers.

"During the past three or four years most of the time of our chemical laboratory has been devoted to research work in the chemistry of various foods and the chemical changes caused by the processes of preparing them for the market, with special reference to the requirements of containers. This work has been done in co-operation with the

pure food authorities, the purpose being to increase the confidence of the public in the purity of canned foods and thus to enlarge the market for cans."

January Copper Production and Stock

The largest January production ever known and a falling off in exports in that month have resulted in an increase in the stock of marketable copper in this country of 17,885,750 lb. at the close of the month, according to the statement issued by the Copper Producers' Association. The statement compares as follows with that for December:

	January. Lb.	December Lb.
Stock of marketable copper of all kinds on hand at all points in the United States at first of the month.....	105,312,582	86,164,055
Production of marketable copper in the United States from all domestic and foreign sources in the month.....	143,479,625	143,354,042
Deliveries of marketable copper in the month:		
For domestic consumption.....	65,210,030	58,491,721
For export	60,383,845	65,713,796
Total	125,593,875	124,205,519
Stock of marketable copper of all kinds on hand at all points in the United States at close of the month.....	123,198,332	105,312,582

An encouraging feature of the above statement is the enlarged domestic consumption in January, as compared with December. European consumption, according to advices just received from Henry R. Merton & Co., London, may be expected to improve, as they report, under date of January 25: "The better outlook on the Balkan situation has released a great number of orders which had been withheld for so long. Copper plates, sheets, wire and other manufactured products were purchased in large quantities, and there is now once more great activity in all the manufacturing branches of the copper trade."

The Chicago Pneumatic Tool Company's Year

The financial results of the Chicago Pneumatic Tool Company's operations ended December 31, 1912, have been published. They compare as follows with the two preceding years:

	1912.	1911.	1910.
Net profits	\$1,002,260	\$772,527	\$1,054,809
Deduct—Bond interest ..	\$115,000	\$115,000	\$116,733
Dividends, 4%	257,951	257,951	257,951
Sinking fund	50,000	50,000	50,000
Depreciation, &c.	236,065	194,788	193,149
Total deductions	\$659,016	\$617,739	\$617,834
Undivided profits	\$343,244	\$154,788	\$436,975

The balance sheet compares as follows:

Assets.		1912.	1911.
Real estate, plant, patents, good-will &c., less reserves		\$7,013,545	\$6,978,288
Stock in other companies, &c. (cost) ..		1,121,670	1,121,670
Treasury bonds		200,000	200,000
Treasury stock		37,000	37,000
Cash		121,399	92,385
Accounts and bills receivable less reserves.....		1,420,895	1,143,211
Sinking fund		744,445	682,906
Inventories		1,619,418	1,405,138
Total		\$12,278,373	\$11,660,598
Liabilities.		1912.	1911.
Capital stock issued.....		\$6,485,000	\$6,485,800
Bonds issued		2,500,000	2,500,000
Interest on bonds.....		122,512	122,213
Dividend payable Jan. 25.....			
Accounts, &c., payable		396,624	196,740
Reserves		12,610	9,002
Bills payable		10,000	
Sinking fund		744,445	682,906
Surplus		2,007,181	1,663,937
Total		\$12,278,373	\$11,660,598

Among papers to be presented at the fifteenth annual general meeting of the Canadian Mining Institute at Ottawa, March 5-7, are the following: "Recent Metallurgical Developments," by Dr. Alfred Stansfield, McGill University, Montreal; "The Steel Industry of Nova Scotia," by Thomas Cantley, New Glasgow, N. S.; "The Iron Resources of Quebec," by Prof. E. DuLieu, Ecole Polytechnique, Montreal; "The Agglomeration of Iron Ores," by N. V. Hansell, New York; "Prospecting the Iron Sands of Natashkwan, Que., with the Empire Drill," by G. C. Mackenzie, Department of Mines, Ottawa.

Cement Instead of Fire Clay

Its Use in the Hearth and Bosh of Sheridan Blast Furnaces

[The January number of the Bulletin of the American Iron and Steel Institute has the following article by S. H. Chauvenet, manager Berkshire Iron Works, Sheridan, Pa.]

The two furnaces at Sheridan, Pa., were built, No. 1 in 1862 and No. 2 in 1872. No. 1 furnace is 10 x 15 x 80 ft. It was built for a charcoal stack, and was the old-style stone stack about 25 ft. high with a firebrick lining. It was a hillside furnace with the top on a level with the stock house floor, thereby requiring no hoist. In 1867 a shell was put on this furnace from the top of the stone-work, making the total height of furnace 80 ft. Two 4-in. tuyeres were put in each of the four tuyere arches, the tap hole and cinder notch being in the front arch.

No. 2 furnace is 10 x 16 x 76 ft. Instead of stone the base was a circular mass of red brick 7 ft. thick at the base, through which six tuyere arches were left about 8 ft. wide by 8 ft. high. On the top of this brickwork rests the furnace shell. The total height of furnace is 76 ft. About 8 ft. above the center of tuyeres the bosh lining strikes the red brick casing, which forms a binder for the top 8 ft. of bosh walls. There is a space of 2 ft. between the walls of the crucible and the red brick casing. The crucible is bound with 4½-in. tee-rails, outside of which is a ¼-in. wrought-iron jacket. The jackets and rails are held in place by two circular bands, 2 x 5 in., each in three segments. On the ends of each segment of the bands are cast-steel lugs, through which are put 2½-in. bolts. Lead washers ¾ in. thick are put under the heads and nuts of these bolts to take up the expansion. The 4½-in. space between the hearth jacket and the firebrick of the crucible wall is filled with coarse gravel. A circular pipe, perforated, runs around the top of the jacket, from which water is continually sprayed on the gravel. This puts the water directly on the brickwork. The water escapes through holes about 1 ft. above the bottom of the jacket, so that for 1 ft. above the hearth line the furnace is standing in water.

The old salamanders in the bottom of these furnaces are so deep and run so far under the old brick and stone casings that it was impossible to take them out without disturbing the whole support of the furnaces. It was therefore necessary to use the salamander as the hearth bottom and also to lay the brickwork of the hearth wall on it. This made such a rough, thick joint that when laid with fire clay we had trouble from breakouts of iron. It occurred to me that as cement was made under such high temperature it would stand the hot iron as well as fire clay or better. We therefore laid the first course in pure cement mortar, some of the joints being 3 in. thick. We had no breakouts on these joints, although holding as much as 50 and 60 tons of iron in the 10-ft. diameter of the hearth.

In the last relining of No. 2 furnace the foundation for the crucible wall was so rough that we could not cut brick to fit it without very heavy joints of cement. We therefore used concrete made of one part cement, three parts ground firebrick and five parts firebrick broken to ¼ in. and ½ in. This we rammed in for the bottom of the crucible wall, for 1 ft. in height, when we had a smooth, even surface on which to start the brickwork. The first 2 ft. of brickwork above the concrete was also laid in cement mortar, and on the outside of the crucible wall we used cement all the way up to the tuyeres. The salamander in the center of the crucible was 18 in. above the hearth line. This furnace has been in blast for seven months and the concrete base still holds.

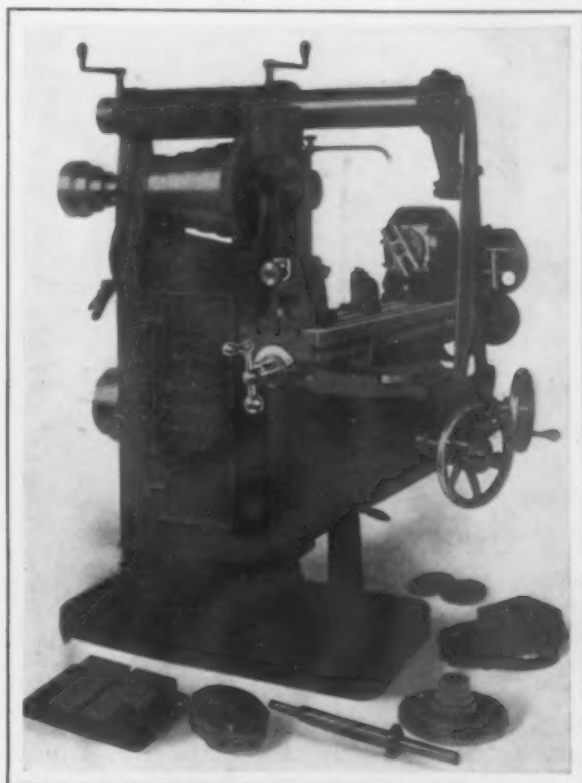
We have been using cement in this way for the past 12 years and no breakouts have occurred. Albert Broden of the Reading Iron Company was so much impressed with our use of cement at Sheridan that when an explosion in its Keystone furnace blew the lining out of the gas flues to the first elbow, he relined both flues with concrete made with cement and blast furnace slag. This has stood perfectly.

Musconetcong furnace at Stanhope, N. J., will be blown in the latter part of February. It was last active in 1910.

An Improved Small Universal Milling Machine

A new 20 x 17 x 7½-in. universal milling machine has been brought out by the Oesterlein Machine Company, Cincinnati, Ohio. The general construction of this new machine is the same as the one illustrated in *The Iron Age*, April 7, 1910. The principal changes made in the design are in the column, the driving mechanism and the use of handwheels to control the adjustment.

In the new design the column is made with a straight line back and the back gear is placed inside it and below the spindle. An improved type of cone driving pulley with larger steps is employed, and the arbor is driven with a clutch in front of the spindle instead of the tongue on the end of the arbor. The oil well method of lubrication is employed for the spindle, the reservoirs being located in the column. A taper sliding gib clamping along the whole face of the column and operated by one lever is employed to bind the knee in any desired position. For the cross



The New 20x17x7½ In. Universal Milling Machine Built by the Oesterlein Machine Company, Cincinnati, Ohio

and vertical adjustments, handwheels have been provided in place of a detachable crank, and an automatic cross-feed is also furnished.

Intoxication does not constitute willful misconduct on the part of an employee within the meaning of the Wisconsin workmen's compensation act, according to a decision of the Industrial Commission of Wisconsin, in awarding \$2040 to the widow of Patrick Smith, employee of the Neekoosa-Edwards Paper Company, Grand Rapids, as compensation for his death. The evidence was conclusive that Smith was intoxicated, and it was found that but for the intoxication the accident would not have happened. However, the commission holds that the point was deliberately omitted from the law because it is accepted that, if a man is known to be addicted to drinking to a degree that such action would make him unfit or dangerous as an employee, he should not be employed.

The Blair Engineering Company, 17 Battery place, New York City, has closed a contract with the Inland Steel Company, Indiana Harbor, Ind., to equip its open hearth furnaces with Blair ports. Another recent contract was made with the United States Steel Company, Canton, Ohio, to equip all of its furnaces with Blair ports.

Low-Grade Fuel for Motor Trucks

The Promise of Kerosene, Distillate, Etc.,
for Use in the Commercial Vehicle

The availability of low-grade fuel for motor trucks was discussed at some length by N. B. Pope, in a paper read before the Society of Automobile Engineers at its New York meeting, January 16 to 18. From it have been taken the following notes:

As immediate substitutes for gasoline there are available: 1, Kerosene; 2, distillate; 3, naphtha.

Kerosene is exceedingly plentiful, low in cost, uniform in quality, promises to continue in abundance and, if demanded in large quantities for motor fuel, could be disposed of in the domestic market with greater profit to the refiner than when marketed abroad, as is so largely done at present.

Engine distillate is a product obtained from the Western crude oils after the lighter fractions have been distilled off, and, in a way, is analogous to kerosene in respect to its position in the scale of petroleum derivatives. It is less thoroughly refined, however, and at present is to be considered principally as a local product. Its practical equivalent could be produced from other asphaltic oils, such as those of Texas and Mexico.

Naphtha is as indefinite a term as gasoline. In its present use it is intended to embrace not only the heavier fractions that commonly are included with the gasoline distillation, but also the fractions between gasoline and kerosene, which are at present lost to the automobile fuel market. Being slightly more volatile than kerosene and moreover free from the doubtful reputation that kerosene enjoys as a fuel, it should prove easier to introduce, first, because the user is in no wise prejudiced against it, and, second, because its employment entails less experimental development.

In considering the comparative utility of different fuels, particularly as between gasoline and the lower-grade petroleum distillates, there is little question of thermal equivalents. Whatever difference exists is, if anything, in favor of the heavier products. Volatility, however, as expressing the ease with which the mixture may be generated, is of paramount importance. Volatility, viscosity and gravity together indicate the comparative facility with which a fuel can be reduced to the condition of a dry or wet mixture and so delivered to the engine.

Carburetion and Starting

That a liquid cannot be carburetted by ordinary methods need not condemn it for use in the internal combustion engine, but it does exclude it from consideration as a fuel for automobiles of present construction. In this way it is perfectly true that the carbureter is really the determining factor in fuel selection. As the values of volatility, viscosity and gravity are lowered the fuel becomes, respectively, harder to vaporize, more difficult to force through small orifices and requires a greater lifting effect (suction) to overcome its superior mass per unit of volume. With the heavier fuels, therefore, different proportions must be employed in the carbureter in order to obtain results corresponding to those obtained in successful instruments designed for gasoline. It is evident at least that a carbureter designed for heavy fuel may be more satisfactorily operated with gasoline than a gasoline carbureter with heavier fuel. To assist in the vaporization of the lower-grade fuels more heat is necessary than for gasoline. This is due largely to the fact that the latent heat of the heavier fuels is greater than that of gasoline.

It is reasonable to conclude that a mechanical starting device will always be required for low-grade fuel motors, and that in addition either the use of a high-grade fuel for the first few moments of operation will be necessary, or else a method of priming. In many respects the latter method is preferable, especially if acetylene be used, since it permits starting without special carbureter adjustment (other than choking of the air), simplifies bi-fuel tank and piping complication, and further introduces into the primary charges a high-velocity combustible which serves as kindling material for what is practically a normal charge.

There is every reason to believe that in the natural course of events engine-starting appliances will soon be-

come a practical necessity on all motor vehicles, so that the development of such devices for commercial vehicles in connection with the adoption of low-grade fuels need not be viewed in the light of a special and purely incidental burden. Practically speaking, starters are more necessary on commercial vehicles than on pleasure cars, through their economic advantage in conserving the driver's energy and because they permit the shutting down of the engine for all loading stops.

Development of Low-Grade Fuel Cars

As a large proportion of commercial vehicle types may be said more truly to be in the early stages of evolution than are pleasure vehicles, it follows that the adaptation of special apparatus for handling low-grade fuels will work less hardship on the truck manufacturer than it would if forced on the builder of established types of pleasure vehicle. Further, the higher valuation placed on operating economy by the commercial vehicle purchaser must tend to render the kerosene or naphtha-burning machine a more acceptable offering in that field than a pleasure car possessing the same feature would be in its field. Indeed, were it possible to offer almost any large truck user a carbureter that would handle a low-grade fuel as efficiently as his present carbureter handles gasoline, there is little question that he would accept the substitute immediately, on the basis of a not unreasonable performance guarantee.

Hydraulic Press Mfg. Company's Expansion

A recent meeting of the stockholders of the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, authorized an increase in the capital stock from \$160,000 to \$260,000. The new stock issue is first preferred 6 per cent. cumulative. The working capital of this company, including surplus and undivided profits, will now be \$350,000. The company states that this investment is represented by nothing but substantial and tangible assets. Such property as patterns, drawings, patents, etc., is not included, although the company owns assets of this character which have cost nearly \$100,000. The new stock issue is practically all subscribed.

Many improvements and plant extensions have been arranged for. A new erecting shop, 80x150 ft., will be built at once. A switch connecting with two divisions of the New York Central Lines will run through one end of this shop. An electric traveling crane with a 40-ft. span and a 25-ton hoist is included in the equipment. Plans and specifications for the new erecting shop will be ready to be submitted for bids within two or three weeks. In the past year the office building and equipment were doubled in size and capacity. The company designs and manufactures hydraulic presses and pumps for a great variety of purposes. The business of this company, which was organized in 1877, has increased rapidly in the past five years, last year's business being the largest of any done in its experience.

New Operating Means for Drum Type Controllers

The straight backward and forward motion of the operating handle of a drum controller is sometimes a little more convenient than the usual rotary one in a horizontal plane on account of its location in some particular place. A vertical lever arrangement with bevel gear drive, which can be applied to three alternating-current and six direct-current types of inclosed drum controllers, has been developed by the Cutler-Hammer Mfg. Company, Milwaukee, Wis. In this arrangement the lever has a centering latch, which is released by depressing the button at the end of the handle, the same as in the case of the horizontal rotating type lever. It is claimed for the new lever that the operation is very easy, and the milled star wheel and notched lever permit all the points of control to be distinctly felt. The construction of the drum, the non-stubbing fingers, arc deflectors, cylinder, etc., remain the same as in the original controller, which was illustrated in *The Iron Age*, June 29, 1911. In addition to lever operation, special arrangements can be made for operating the controller by rope if this should prove desirable.

Bureau of Mines and Its Pittsburgh Quarters

The United States Bureau of Mines, which has been conducting its investigations under difficulties because of a lack of space in the buildings of its experiment station at Pittsburgh, has called on Congress to appropriate \$500,000 for a series of new buildings, the sum of \$300,000 to be immediately available. This appropriation has been included in the general public buildings bill, which has not yet come up for passage.

The experiment station of the bureau at Pittsburgh is located on what is known as the Arsenal property, the work being conducted in buildings entirely unsuited for the present purposes. Some of the buildings were erected nearly 100 years ago for the War Department and are in a dilapidated state. They were in disuse at the time the bureau obtained them, but the War Department has recently found that it needs for its own work the buildings or the ground on which they are situated, and on three different occasions has ordered the Bureau of Mines to move.

Dr. J. A. Holmes, director of the bureau, appearing before the Committee of Public Buildings and Grounds, made the statement that the work of the bureau, which began in 1904, has never had any permanent abiding place, but has been moved from place to place at a cost to the Government of at least \$150,000. He said:

We are scattered around, not only in a number of buildings there, but in other parts of the country. The work of the bureau would be greatly facilitated and the character and efficiency of the work would be tremendously increased if we could get settled somewhere in a place that we could fit up adequately and suitably for the investigations we have to conduct.

There have been 30,000 men killed in the coal mines in the last 10 years and nearly 20,000 seriously injured. The work such as we have been able to do in our present location within the past year has yielded a reduction in the annual loss of life of not less than 500, but the great loss is still a discredit to the nation. The investigations that we want to pursue look toward a further reduction in that loss of life.

In addition to that great work we are doing in protecting the lives of coal miners, we have been able, even with the inadequate facilities we have had, to save to the United States Government in actual cash, during the last three years, not less than \$100,000 a year in its fuel bill.

There are six separate buildings proposed. Each one must be specially adapted to the purpose for which it is intended. That is the reason we can not rent suitable buildings; we cannot find buildings suitable to our needs. We propose to have the cheapest sort of construction that will be decent to have in a city. We do not intend to have anything ornamental; all we want is a floor and a roof and glass sides.

Dr. Holmes declared that the building most urgently needed was one for mine-rescue work. The buildings asked for include: Mining engineering building, 50 x 200 ft., 3 stories, to cost \$100,000; mine-rescue building, 50 x 100 ft., 2½ stories, \$40,000; chemical building, 50 x 200 ft., 3 stories, \$100,000; explosives building, 50 x 80 ft., 2½ stories, \$30,000; mechanical building, 50 x 150 ft., 3 stories, \$75,000; fuels building, 50 x 150 ft., \$55,000; service building, 60 x 100 ft., \$60,000; tunnels, pipe lines, etc., \$20,000; sidings, storage bins, approaches, etc., \$20,000. Total, \$500,000.

The Supreme Court's View of Monopoly

In the decision of the United States Supreme Court refusing to sustain the Department of Justice in its suit to dissolve the United Shoe Machinery Company, a very interesting statement appears as follows with regard to the question of monopoly: "We cannot see any greater objection to one corporation manufacturing 70 per cent., or three competing groups of patented machines collectively used for making a single product, than to three corporations making the same proportion, or one group each. The disintegration aimed at by the statute [Sherman anti-trust act] does not extend to reducing all manufacturers to isolated communities of the lowest degree. It is as lawful for one corporation to make every part of a steam engine and to put the machine together as it would be for one to make the boilers and another to make the wheels. Until the intent is nearer accomplishment than it is by such juxtaposition alone, no intent could raise the conduct to the dignity of an attempt."

The Mining Industry Asks Larger Appropriations

J. F. Callbreath, secretary of the American Mining Congress, 1021 Munsey Building, Washington, D. C., has issued a strong plea for greater recognition by Congress of the needs of the mining industry of the United States. He makes the statement that agriculture, which has been fostered for years by the National Government, has been making tremendous gains as a result of this aid, but that the Western mining industry, with its complex low-grade ore problems unsolved, is a waning industry with a constantly decreasing number of men employed. He declares that mining in the Western States is practically at a standstill and that there is no hope of reviving it until Congress has a fairer idea of the great importance of mining to the prosperity of the country.

Mr. Callbreath believes that the mining industry of the United States, which employs 1,000,000 miners and 2,000,000 others directly connected with its work, with an annual production of \$2,000,000,000, is not understood and appreciated by Congress. As the two foundation industries of the United States are agriculture and mining, the mining industry should receive recognition in better proportion to its importance. He claims that the total federal aid given to agriculture will from this time be annually at least \$20,000,000. As to mining interests, he states that the Bureau of Mines is getting about \$500,000 a year and that the Geological Survey is getting \$1,500,000 a year, making but \$2,000,000 of aid for this special industry. In view of what the Bureau of Mines is doing to reduce the death rate in mines, the country can well stand \$2,000,000 or \$3,000,000 each year for its work. The days of bonanza mining having gone and the country now being down to the treatment of low-grade ores, he believes that the problems regarding processes by which these ores may be reduced can only be solved through the aid of the Government. He states that the mining industry must go hand in hand with agriculture, the prosperity of the country depending upon the success of both.

General Electric's Large Australian Contract

In competition with leading European manufacturers of electrical apparatus, the General Electric Company, Schenectady, N. Y., has obtained contracts for the whole of the direct-current high voltage equipment and control apparatus to be used in the electrification of the suburban railroads of the city of Melbourne, Australia. This is the largest single order ever placed for railroad motor apparatus. Melbourne, with a population of 500,000, is to spend nearly \$12,000,000 for the electrification of all its steam suburban lines and nearly a third of this sum will come to the General Electric Company for equipping the rolling stock. Four hundred four-motor car equipments, requiring 1600 motors, of 140 hp. each, will be made in this country.

Overhead trolley wires, with pantograph trolley collectors, will be used throughout the 150-mile system for supplying current to the trains. With electricity the average speed of the trains will be increased by nearly a third. Engineers estimate that electrification will save \$625,000 a year by 1915 in operating expenses.

The direct-current 1500-volt system to be installed will be the heaviest type ever designed for overhead railroad practice. Trains weighing 180 tons will be made up of four coaches, two motor cars and two trailers, and two-car units will be added as the traffic demands.

The electrification of Melbourne will be one of the largest undertakings of its kind, and the equipment will correspond to that used at the New York Central Terminal, although the overhead trolley will be used instead of the third rail system. Instead of electric locomotives to haul the trains, the multiple unit system will be used.

Molten slag has been used for embankment work on the Wheeling & Lake Erie Railroad along the Ohio River. A second track was recently built and the roadbed being on a side hill, the widening was done by filling on the river side, first with heavy mill refuse together with clay and ordinary slag. It later became necessary to protect the slopes and molten slag was employed. The work included about 3500 ft. at both Brilliant and Rush Run, Ohio.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

ACCEPTANCE OF MACHINERY BOUGHT.—When machinery is sold under a warranty by the seller that it will operate successfully the buyer is entitled to reasonable opportunity in which to test the machinery by putting it to the use for which it was bought before he can be deemed to have finally accepted delivery. (Colorado Court of Appeals, *Shaw vs. Water Supply & Storage Company*, 128 Pacific Reporter 480.)

REGULARITY OF DIRECTORS' MEETING.—Unanimous action taken by a board of directors at a meeting attended by all the members is not vitiated by the fact that the meeting was held without formal notice or call. (New Jersey Court of Errors and Appeals, *Robson vs. C. E. Fenniman Company*, 85 Atlantic Reporter 356.)

DELIVERY OF CORPORATION'S NOTE IN PAYMENT OF OFFICER'S DEBT.—A corporation's officer's act in delivering its note in settlement of his own personal indebtedness is presumptively unauthorized, and, if not actually authorized, is not binding on the company. (Washington Supreme Court, *Mooney vs. O. P. Mooney Company*, 128 Pacific Reporter 225.)

CONDITIONAL SELLER'S RIGHTS AGAINST THIRD PERSON.—When a contractor knows that a seller of machinery sold to his sub-contractor has reserved title until payment of the price he is liable to the seller for damages to the machinery after taking possession of it over the sub-contractor's protest. (Washington Supreme Court, *United Iron Works vs. Hurley Mason Company*, 128 Pacific Reporter 209.)

JOBBER'S MEASURE OF DAMAGES FOR MANUFACTURER'S BREACH OF CONTRACT.—On breach of an agreement by a manufacturer to furnish machinery, etc., to a jobber, the latter is entitled to recover the amount of profits lost through his inability to fill orders received, where he was unable to procure such machinery in the general market. (Iowa Supreme Court, *Portable Elevator Mfg. Company vs. Bradley, Merriam & Smith*, 138 Northwestern Reporter 915.)

WHEN SHOW CASES, ETC., ARE NOT REMOVABLE FIXTURES.—When the owner of a building constructs therein large show cases, racks, etc., nailed to the floors, walls and ceiling they must be regarded as part of the building and not as fixtures removable by him, on a sale of the building. (Illinois Supreme Court, *Owings vs. Estes*, 100 Northeastern Reporter 205.)

STATE INTERFERENCE WITH INTERSTATE COMMERCE.—The Kansas statute which attempts to require non-resident business corporations to file statements of their financial condition with the Secretary of State, as a condition precedent to being permitted to do business or sue in the State, is void, so far as it applies to corporations whose business done in that State is interstate commerce only. (United States Supreme Court, *Buck's Stove & Range Company vs. Vickers*, 33 Supreme Court Reporter 41.)

IMPLIED WARRANTY OF ARTICLES SOLD.—When the seller of goods does not expressly warrant their quality, there being an implied warranty only, the buyer is bound to test the goods before using them and return them if they are found to be unmerchantable. If the seller is not the manufacturer, the fact that he knows the purpose for which the goods are bought does not create an implied warranty by him as to their fitness for that purpose. (New York Supreme Court, First Appellate Term, *Leiter vs. Innis, Speiden & Co.*, 138 New York Supplement, 536.)

ATTACHMENT OF HEAVY MACHINERY.—Heavy lathes, a drill press and a hand milling machine, which the owner of a manufacturing establishment has placed in a leased building, two of them being bolted to the floor, are not exempt from attachment on the ground that they are part of the real estate and, hence, not attachable as personal property; the rules between landlord and tenant relating to fixtures applying, and there being strong presumption that the machines, being removable, are not intended as part of the realty. (Maine Supreme Judicial Court, *Tolman vs. Carleton*, 85 Atlantic Reporter 390.)

CARRIER'S RIGHT TO FREIGHT STORAGE CHARGES.—In Texas, railroad companies are not allowed to charge storage on freight received by them for delivery, unless the owner or consignee thereof neglects to remove it from the depot of the company within three days after notice of its arrival, which notice may be given by posting it on the depot door, and after expiration of such time the company may remove and store the freight at the expense of the owner or consignee, and the shipment then becomes subject to a lien for the freight storage charges due thereon. (Texas Court of Civil Appeals, *Gulf, Colorado & Santa Fe Railway Company vs. Patten Mfg. Company*, 151 Southwestern Reporter 1158.)

PURCHASE BY CORPORATION OF OWN STOCK.—Unless prohibited by its charter or by statute, a solvent corporation can purchase its own stock, if it is done in good faith, as where such action is taken to settle differences in the management of the corporation. Purchase by a company of its own stock does not amount to a reduction or merger of the stock. (Texas Court of Civil Appeals, *San Antonio Hardware Company vs. Sawyer*, 151 Southwestern Reporter 1104.)

GUARANTY BY SALESMAN OF PAYMENT BY BUYER.—Where a wholesale dealer rejected an order taken by a salesman traveling on commission, on account of the buyer's financial condition, but the goods were afterward shipped on a letter from the salesman stating: "If my indorsement is worth anything you can ship on that. * * * I am vice-president of the McCarroll Brothers Company," such letter must be regarded as a guaranty of payment, even though no notice was given him that the guaranty was accepted or that the buyer had failed to pay. (Arkansas Supreme Court, *McCarroll vs. Red Diamond Clothing Company*, 151 Southwestern Reporter 1012.)

VALIDITY OF REGULATION AGAINST JUNK DEALERS.—The New York law which makes it a criminal offense for a dealer in junk, metals or second-hand materials to buy or receive any wire, cable, copper, lead, solder, iron or brass used by or belonging to a railroad, telephone, telegraph, gas or electric light company, without making diligent inquiry for the purpose of ascertaining whether the person selling or delivering it has a legal right to do so, is a valid statute, though it does not protect the owners of blast furnaces and brass foundries or other classes who are liable to losses by theft of articles of like kinds. (United States Supreme Court, *Rosenthal vs. New York*, 33 Supreme Court Reporter 27.)

WHAT CONSTITUTES SALE BY SAMPLE.—In order to establish a contract by a seller to furnish goods conforming to a sample it must appear that it was definitely intended by the parties that the goods should conform to the article exhibited, it being insufficient to merely show that during the negotiations the seller exhibited or discussed a specimen. (United States Circuit Court of Appeals, Second Circuit, in re *Nathan*, 200 Federal Reporter 379.)

DAMAGES RECOVERABLE FOR CONTRACT TO BUY COAL.—The damages recoverable for a breach of contract to buy coal to be delivered throughout a year are measured by the difference between the contract price and the market price under another contract as similar to the broken agreement as the seller can obtain. (United States Circuit Court of Appeals, Second Circuit, *Skeele Coal Company vs. Arnold*, 200 Federal Reporter 393.)

INFRINGEMENT OF STOVE TRADEMARK.—The trademark "Shipmate" as applied to a ship galley stove is infringed by a rival manufacturer's use of the name "Messmate." (United States District Court, Southern District of New York, *Stamford Foundry Company vs. Thatcher Furnace Company*, 200 Federal Reporter 324.)

EMPLOYERS' LIABILITY INSURANCE.—After assuming exclusive charge of the defense of an employee's suit for personal injury, an employer's liability insurance company cannot deny liability on a policy on the ground that the employer failed to comply with the requirements of the factory act in the State, though the policy contains a clause exempting the insurance company from liability in such cases. (United States Circuit Court of Appeals, Ninth Circuit, *Empire State Surety Company vs. Pacific National Lumber Company*, 200 Federal Reporter 224.)

TIME FOR ACCEPTANCE OF OFFER TO SELL.—When an offer to sell goods does not limit the time for acceptance and is not withdrawn or rejected it is open to acceptance any time within a reasonable period. (Arkansas Supreme Court, *C. C. Emerson & Co. vs. Stevens*, 151 Southwestern Reporter 1003.)

EXISTENCE OF MONOPOLY NO DEFENSE TO SUIT FOR TRADE MARK INFRINGEMENT.—It is no defense to a suit for infringement of a trademark that plaintiff's sale contracts are invalid as being violative of the Sherman anti-trust act. (United States District Court, Northern District of Alabama, *Coca Cola vs. Deacon Brown Bottling Company*, 200 Federal Reporter 105.)

DAMAGES RECOVERABLE FOR DELAYING FREIGHT.—The measure of a railroad company's liability for negligent delay in delivering machinery intended for use, in the absence of special notice, is the usable or rentable value of the machinery during the period of delay, together with such reasonable expenses as may be incurred by plaintiff in searching for or recovering the shipment or in endeavoring to secure delivery. (Oklahoma Supreme Court, *Missouri, Oklahoma & Gulf Railway Company vs. Hazlett*, 128 Pacific Reporter 105.)

Book Reviews

Analytical and Testing Methods for Iron and Steel Works Chemists (Chemische Untersuchungsmethoden für Eisenhütten und deren Nebenbetriebe). By Albert Vita and Carl Massenez. Pages VIII + 175, 3½ x 8½ in.; illustrations, 26. Published by Julius Springer, Berlin. Price, 4 marks.

The authors of this inexpensive book of laboratory methods should be well fitted for their work. One of them is the chief chemist of a large steel plant in Upper Silesia and the other is on the teaching staff of the University of Breslau. They describe the book as a collection of methods that have been tested practically. The first section takes up the important subject of sampling, and then follow the methods recommended for the examination of ores, pig iron, steels, ferroalloys, slags, refractory materials, fluxes, fuels, etc. There are several noteworthy features, such as the inclusion of sections on blast furnace by-products, coal tar, pitch, ammonium sulphate, benzol, bearing metals, oils and lubricants. Those on benzol and lubricants are especially interesting; the first because of the evidence of the growing importance of benzol recovery in coke oven practice, and the second because the subject of the proper testing and control of oils and lubricants has not been given the attention it should have in our large plants. In the section on pig iron and steel a new method for the volumetric determination of sulphur is given, that has been worked out by the authors.

The book covers the whole field of operation of the modern steelworks laboratory, whether ordinary or special steels and other products have to be tested. Nothing seems to have been overlooked. The matter is presented in a very practical way, no unnecessary words being used, but enough detail being given to enable the ordinary chemist to follow the methods. It gives, therefore, a clear, concise picture of the methods in use in Germany, and on this account alone should be in the library of every chemist dealing with steelworks materials, who has even a rough working knowledge of German. G. W. B.

Textbook of Mineral Chemistry (Handbuch der Mineral Chemie). By Dr. C. Doelter. Pages 160, 7 x 10 in.; illustrations, 22. Published by Theodor Steinkopf, Dresden and Leipzig. Price, 6.50 marks.

This entire work is to consist of four volumes each divided into several parts. The present issue is Vol. 2, Part 1, and deals entirely with silica and the silicates. There is a very interesting section of 49 pages on the Constitution of the Silicates by Dr. Doelter, who is the director of the Mineralogical Institute at the University of Vienna, and also one by the same writer on Quartz. The price of the complete work is to be about 130 marks.

The "Practical Engineer" Pocket Book Diary for 1913. Pages, 588, with diary for year additional, 3½ x 5½ in., opening endwise. Illustrated. Published by the Technical Publishing Company, Ltd., 55-56 Chancery Lane, London, W. C. May be obtained from the David Williams Company, 239 West Thirty-ninth street, New York. Price 60c., postpaid.

This is the twenty-fifth and revised edition of a pocket volume replete with information useful to the engineer. Special attention is called to the new machine tool section which was prepared by Thomas R. Shaw, A.M.I., M.E.

Popular Mechanical Year Book for 1913. Pages, 224; 6½ x 9½ in.; illustrations, 503. Published by Popular Mechanics, Chicago, Ill. Price 50c., postpaid.

The ninth volume of what is known as the "Shop Note Series." It consists of a reprint of 595 articles which appeared in the shop notes department of Popular Mechanics Magazine in 1912. In non-technical language there are described many useful time-saving "kinks" of interest to all classes of mechanics. Indexed.

Official Handbook of the Panama Canal.—The secretary of the Isthmian Canal Commission, Ancon, Canal Zone, has issued the third edition of the Official Handbook of the Panama Canal, revised and enlarged. This is a publication of 53 pages, accompanied by a map showing the Isthmus with the completed canal. The information given comprises numerous details regarding the canal which are

the matter of popular inquiry. All the measurements are set forth, together with descriptions and drawings of the Gatun dam, the locks, the gate-moving machinery, protective devices, the scheme of lighting, the harbor improvements, etc. Other details refer to the manner in which the construction of the canal has been prosecuted, the amount of work performed and the arrangements made by the commission for handling and supplying the requirements of the large force of men employed.

Customs Decisions

Automobile Wheels and Tires

The Board of United States General Appraisers has decided that the tariff act of 1909 requires that automobile tires and wheels must be assessed for duty separately. Collector Loeb of New York held that as the tires and wheels were assembled articles they were properly dutiable at 45 per cent. ad valorem under the provision in the law for "parts of automobiles." Thomas Meadows & Co., and Irving Katz, the importers, claimed the wheels dutiable as assessed, but alleged that the tires should be granted a separate rate of 35 per cent. ad valorem as manufactures of rubber. In sustaining the contention, Judge Fischer holds that tires are expressly excluded from paragraph 141, which covers "finished parts of automobiles."

Rotary Printing Presses

The customs authorities at New York were reversed in their assessment of duty on rotary printing presses for use in printing designs on paper. The presses were classified under the act of 1909 at 45 per cent. as manufactures of metal. They were claimed dutiable at 30 per cent. under the provision for printing presses.

Type

Charles D. Stone & Co. were sustained in a controversy dealing with the classification under the present tariff of new type. Assessment was made at 45 per cent. ad valorem whereas the importers asked for a rate of 25 per cent. under paragraph 191, as new type. The same firm was unsuccessful in claims relating to card-cutting machines, which were alleged to be dutiable at 30 per cent. as machine tools. The collector's return at 45 per cent. as manufactures of metal was affirmed.

Steel Forgings

The board overruled a protest by the New York Shipbuilding Company, relating to steel tail shafts, forged and rough-machined. Assessment was made under paragraph 199 of the tariff act, at 45 per cent. ad valorem as manufactures of metal. Duty was claimed at 30 per cent. ad valorem as forgings under paragraph 123. Judge Fischer says it is conceded in the record that the shafts have been rough-machined subsequent to the forging process and that the only question to be determined is whether this substituted process for close hammering or forging would take the articles out of the provision for forgings. The decision says that the board is unable to make any distinction in principle between the rough-machined shafts in controversy and the metal hoes passed on in United States vs. Anderson & Co. The decision of the customs court in that case is in the opinion of the board decisive of the issue raised by the shipbuilding company, and following the court decision the protests are overruled.

Metal Containers

The board sustained claims relating to coppers, tin drums and other metal containers, all of which were claimed not to be dutiable under the present law as unusual coverings. The collector's assessment at the rate of 30 per cent. under paragraph 151 was reversed. The importers included E. R. Squibb & Co., Zinkeisen & Co., and Fritzsche Bros.

Meteoric Iron

The board denied a protest by Alexander Murphy & Co., relating to specimens of meteoric iron, which had been assessed at 20 per cent. ad valorem as "metallic mineral substances in a crude state." Free entry was claimed under paragraph 626, as a "crude mineral, not specially provided for."

Electric Auto Tractor for Freight Cars

What is said to be the heaviest and most powerful automobile in the world has been placed in service by the Pennsylvania Railroad Company for hauling freight cars between the company's station at Jersey City, N. J., and the pier two blocks away. The tractor, which will take the place of eight heavy draft horses formerly employed for this work, weighs 28,850 lb. It was built at the Juniata, Pa., shops of the railroad from the design of one of the company's electrical engineers, after several commercial trucks had been tried and found inadequate.

The tractor is electrically operated by two General Electric motors of approximately 20 hp. each, the current being supplied by an 80-cell storage battery. It drives, steers and brakes on all four wheels, this being necessary to secure the required tractive effort around sharp curves. The axles, which are the largest ever built for an automobile, support the driving mechanism, which is of special design, the differential gear also being the largest ever built for this class of work. Special heat treated steel is used for all the gears and the system gives a reduction of about 40 to 1. The wheels are steel castings weighing about 1200 lb. and are equipped with solid rubber block tires on steel bases, so designed that one section can be removed and replaced without disturbing any other. Each wheel is carried on a steering knuckle and is controlled from the cab by a marine type steering wheel, an arrangement which permits the tractor to go around a curve of 20 ft. radius, the rear wheels tracking with the front ones, so that the rear end will clear anything that the front has. The levers in the cab are so arranged that the operator can drive and brake from either side of the steering wheel. The air brake apparatus is automatic, the air being supplied by a motor-driven compressor. The brakes are of the internal expanding type and when applied the controller is brought to the off position, thus making it impossible to use power while the brakes are on. Standard hose couplings are provided to allow air connection with the cars being shifted and a supplementary hand brake is also furnished.

The length of the tractor over couplers is 23 ft., the wheel base being 12½ ft. The wheels are 5 ft. in diameter and 12 in. wide, with a tread of 7 ft. The over-all width of the tractor is 102 in. and the over-all height is 135 in. It has a normal speed, light, of 6 miles per hour, and exerts a normal drawbar pull of 8000 lb. In a trial at the shops, it pulled a locomotive and two cars so easily that it was decided to have the tractor and a locomotive push against each other. The locomotive had a rated drawbar pull of 21,500 lb., but with the throttle wide open it failed to hold the tractor and was moved several feet.

Specifications for Automobile Bronzes

The following specifications for bronzes were accepted at the recent meeting in New York of the Society of Automobile Engineers: Hard bronze, 87 to 88 per cent. copper; 9.5 to 10.5 tin; 1.5 to 2.5 zinc. Gear bronze, 88 to 89 per cent. copper; 11 to 12 per cent. tin; 0.15 to 0.30 per cent. phosphorus. The hard bronze, it is explained, is identical with the United States Government bronze G, having a tensile strength of approximately 35,000 lb. per square inch. It is offered as a general utility bronze for severe working conditions where heavy pressure and high speeds obtain, for light gears, valves, etc. The gear bronze, it is added, is commonly known as English gear bronze and is serviceable for gears and worms where the requirements are severe, especially when quiet running is a desired feature. Some makers, it appears, temper this alloy with a ferrous hardener, using quantities up to 4 per cent.

The Bruce-Macbeth Engine Company, Cleveland, Ohio, has closed a contract with George F. Lasher of Philadelphia for two 300-hp. producer gas engines. These engines, direct connected to generator, operating in parallel, will be installed in the new Metropolitan Building at present under construction, which will be one of the largest power buildings in Philadelphia. With these engines will be installed two 300-hp. gas producers built by the Smith Gas Power Company, Lexington, Ohio.

To Develop the Electrical Industry

Surprising as it may seem, an organization known as the Society for Electrical Development has been incorporated to inaugurate a broad educational campaign pertaining to the electrical and allied industries. While the total American annual expenditure on electric service, apparatus and supplies is in excess of \$2,000,000,000, it is held that this amount can easily be doubled. For example, where it may be found that in a given community a certain per capita amount is paid into the electrical industry, a neighboring community may be paying not more than one-tenth the amount per capita indicating the need of development in the latter locality. The society has headquarters in the Engineering Societies Building, New York City, and it has provided for a meeting to be held in that building on March 4 and 5, so that the various ideas on tentative plans for the expansion may be obtained from as many angles as possible.

It is understood that the society, which has really been a number of years getting under way, starts at this time with some \$200,000 in its treasury, collected from its members on the basis of the net incomes of the members, which include manufacturers and distributors of electrical apparatus and machinery and equipment used in electrical developments.

The present plans cover a broad educational general magazine and class paper advertising campaign, a comprehensive press bureau for the dissemination of news matter pertaining to things electrical and a field department for co-operative and general educational work. Papers from a number of prominent men in the industry are promised for the conference.

German and Belgian Iron and Steel Exports

Germany's exports of iron and steel last year were heavier than ever before. They reached a total of 6,000,902 metric tons, as compared with 5,380,963 tons in 1911. Imports were 673,910 tons, as against 602,452 tons in 1911. The net exports, over imports, were 5,346,992 tons, as compared with 4,778,511 tons for the previous year. The chief items in the export trade were as follows, in metric tons:

	1912.	1911.
Pig iron	1,055,611	832,164
Waste and scrap	160,200	174,211
Semi-finished steel	695,240	651,415
Beams	496,917	408,181
Other structural shapes	839,838	780,827
Heavy plates	297,331	296,161
Light plates	124,711	113,521
Wire, plain	280,815	253,450
Wire polished	151,858	151,518
Wire nails	54,332	58,049
Tubes	169,497	142,120
Steel rails	523,056	520,120
Cross ties and flanges	191,423	123,931

The following table shows Belgium's exports of iron and steel for 1912, compared with 1911, in metric tons:

	1912.	1911.
Bars	632,193	536,653
Plates	195,403	165,673
Steel rails	172,884	170,771
Beams	98,077	79,197
Iron and steel goods not fully specified	132,262	111,794
Wire	61,209	65,815
Wire nails	48,419	44,824
Barbed wire	13,016	12,525
Tin andterne plates	9,830	8,254
Machinery	78,677	68,892

The demand in Salt Lake City, Utah, and vicinity for J-M asbestos roofing, shingles, pipe coverings, stucco and other building materials, packings, plumbing specialties and other well-known products manufactured by the H. W. Johns-Manville Company, has increased to such an appreciable extent that the company has found it expedient to open a branch office in the Dooly Block in that city.

A tribute of unusual character is to be paid to the memory of the late President Donaldson, of the Society of Automobile Engineers. At the recent meeting of the society in New York, a resolution was passed to erect, in the name of the society, a monument over the grave of its former president.

Litigation Over the Norman Mine

Fee Owners Become Partners in Operations—Mine Taxes Heavier and Heavier

DULUTH, MINN., February 8, 1913.—A case brought against the Oliver Iron Mining Company (United States Steel Corporation) by the fee holders of the Norman mine, Mesaba range, in which the cancellation of the lease and damages to the amount of \$1,012,000 on account of alleged injury to the mine and the remaining ore were demanded, has been settled and the action withdrawn. The plaintiffs claimed that the mine was not being operated in a workmanlike manner, "as would be by the proprietors themselves," and that as a result hundreds of thousands of tons of ore were irrevocably lost. The lease was to have expired March 31, 1913, and considerable ore of high grade yet remains in the property, which it will be impossible to remove before that time. This lease was made 20 years ago and at a royalty rate of 25 cents a ton, which is far less than such ore would now bring to feeholders. Terms of the settlement are not made public, but under them the Oliver Company retains the mine until all ore has been taken, paying a fixed proportion of the profits instead of the sum of 25 cents as royalty. The feeholders thus become partners in the operation of the mine from January 1 last. This proportion of the profits will probably bring the feeholders a return several times greater than the 25 cents formerly paid them, but the fact that they are willing to become partners with and to permit continued operation by the company against whose methods they made such allegations would seem to indicate that the Oliver Company was not running the mine to the extent that was alleged. The Norman is a narrow and long trough of ore 300 ft. deep, with inclosing walls that are either vertical or that overhang above the soft ore. Mining has been a difficult undertaking, and has necessarily been attended by more danger than would be the case with most deposits. On account of the fact that the great tonnage of good ore was not discovered until within a few years of the expiration of the lease and of the impossibility of securing a renewal, mining has been carried on with as great speed as was possible under the conditions of the deposit.

A Rich, New Deposit on the Mesaba

What is asserted to be one of the richest deposits yet discovered on the Mesaba lies in a forty adjoining M. A. Hanna & Co.'s Sliver mine in the Virginia district. The ore was found by Harry Osterberg and associates, of Virginia, who hold the tract on a lease based on a royalty of 35 cents a ton, and will be developed by M. E. Richards and associates, who have acquired the right to mine at a reported advance in royalty of \$1 a ton. The deposit is estimated to contain 1,000,000 tons, and it is claimed the assays have showed 65 per cent. in metallic iron. The property had been explored previously, but without results, doubtless because the earlier prospectors did not penetrate to sufficient depth. The mine will be an underground producer. Sinking will be started shortly, with a probability that the initial shipments will be made later in the coming season.

Another prospective Mesaba producer this year is the Roberts property, near Nashwauk, which Butler Bros. will both strip and operate under contract. In the neighborhood of 1,000,000 tons of ore has already been proved up. The overburden is comparatively shallow, averaging less than 25 ft. Butler Brothers are stripping the LaRue mine at Nashwauk, and have about a year's work there yet to do. The new operations will be carried on simultaneously.

Tonnage Tax on Iron Ore

As usual, when the legislatures of Michigan and Minnesota are in session and there is any important question up for which trading votes will be necessary, there are fights over the question of a tonnage tax on mining products. In Michigan it has already been found that the measure cannot carry and the mine communities are relieved. In Minnesota the fight is still on, with representatives of these mining communities foremost in opposition, but with the mining companies doing nothing so far as is known. Were the tonnage tax a measure designed simply to levy the various taxes direct upon output there could be little objection to it, providing some way could be found to maintain a fairly constant and reasonable rate.

But it is a vicious measure in the fact that it proposes to remove the proceeds of the tax upon mines from the communities in which the mines are situated and turn them over to the general tax fund of the State, thus relieving other classes of property exempt from State taxation, and forcing the mining communities into hopeless and permanent bankruptcy. The bulk of taxable property in these towns is in their mines, and the real estate of individuals will be taxed out of existence if all cost of maintenance is saddled on them. Of course the legislators in favor of a tonnage tax do not want this, so they propose that there shall be levied two classes of tax on mines: one a tonnage tax that shall contribute to the general fund for running the State, and the other a valuation tax that shall go toward the support of the county and towns, schools, police and all local activities. This will render the total tax to be levied higher than it is now, a consummation that is to be avoided, if possible, for the present tax is very heavy per ton of product of the mines. For Minnesota it has reached a point where it is now about 20 per cent. of the worth of the ore, while it is far heavier in some of the Michigan districts. This is a fearful tax upon the cost of operation. Instead of being raised, taxes upon the iron mines of the Lake Superior district ought to be materially lower.

The steel and concrete shipping pier the Northern Pacific road is to build at Superior for its expected Cuyuna range development will be 630 ft. long, with an elevated approach of about 3000 ft., and it will be ready in the coming summer. It looks as though Cuyuna shipments for the season might be from 650,000 to 700,000 tons. Exploration by parties very prominent in the early discovery of the district have now shown a third formation, parallel with the two that have been explored upon, and several miles to the south of them. Ore has been found on this new line of attraction, though not as yet in great quantity nor in high quality. However, the work so far done has been slight.

The Steel Plant Railroad Cases

WASHINGTON, D. C., February 11.—Final argument was had before the Interstate Commerce Commission February 5 and 6 in the investigation by the commission in the matter of allowances to short lines of railroads serving industries. This investigation was undertaken to ascertain the relationship and ownership of certain short lines connecting with trunk lines and serving plants in the steel industry. Complaint has been made to the commission that the division of the through rate by railroads with the short lines amounted to a rebate, and discriminated against companies whose plants were located on the main lines or who did not maintain short lines. Attorneys representing the United States Steel Corporation, the trunk lines, and terminal railroads appeared and participated in the argument. In dealing with short lines used in connection with lumbering, the commission some time ago held that they were part of the "plant facilities," and were not entitled to a division of the rate.

The commission has set March 7 for argument in the case of the Pittsburgh Steel Company against carriers operating between Ashtabula and the Pittsburgh district. In this case the rate on iron ore is attacked as being excessive and discriminatory.

W. L. C.

The Rheinfrank House Wrecking Company, Inc., 620 East Fourteenth street, New York, specialist in building demolition, had an important piece of work in handling the old material in razing the Grand Central Station in New York City for the purpose of making room for the new building recently opened for public use. This was an ever changing problem, not only from a time standpoint but for the safety of the traveling public as the work of constructing the new building proceeded simultaneously with the removal of the material from the old one. The material from the buildings was carried to the company's large storage plant and resold and shipped all over the country.

The Cleveland Foundry Company, Cleveland, Ohio, maker of oil stoves and other products, has increased its capital stock from \$400,000 to \$2,000,000. A large part of the increase will go to stockholders as a stock dividend. The entire stove output of the company is made for the Standard Oil Company.

Larger Demands on the Industrial Engineer*

What Is Now Expected in the Way of Social Service and Self-Culture

BY JOHN CALDER

The change which has come over the professional outlook of the engineer within a single decade has been accompanied by a simultaneous extension of the engineering societies in membership and usefulness. Civil, mechanical, electrical and mining engineering and their allied branches have all shared in the prosperity and development and the societies which represent these professions are making history at a rapid rate.

No longer do a few engineers briefly express, at some central point once or twice a year, their views on a very few professional subjects, but provision has now been made for frequent and convenient discussions, at many centers, of numerous topics of current interest. In addition, the general participation therein of the profession at large by correspondence has been provided for. As a result of this greatly intensified activity it has become impossible for the college text-book and even difficult for the reader of technical journals to keep pace with engineering progress. It is therefore greatly to the advantage of the undergraduate, as well as the graduate, to connect himself at the earliest possible stage with one or other of the engineering societies whose privileges mean much to the young engineer. Apart altogether from the technical benefit to be derived from such affiliations there are possibilities of most helpful and lasting friendships and the keen enjoyment of the solidarity of a great profession.

Engineering Ethics

Engineers can atone for inadequate conceptions of professional conduct and for lack of interest in social and civic duty only by securing the predominance and co-operative action within their own ranks of men whose culture and social sympathies are not narrowed by or sacrificed to their vocations, but are wisely guided in student days and intensified and broadened by a subsequent liberal professional discipline. That discipline should include some instruction in engineering ethics, hitherto the subject of no propaganda.

There is a large field of professional matters on which guidance is needed. Some has already been afforded, but it chiefly relates to the ethics of the consultant's and contractor's spheres outside of which the great bulk of our engineers now practice. The engineer may have relations with and obligations to clients, but he is practically certain during the greater part of his business life to have relations chiefly with employers, employees, fellow engineers and the public at large. In all of these his conduct should be guided by the highest principles and his association with doubtful enterprises, individuals or methods, a matter of watchful concern.

But his conduct and the area over which his principles operate will largely depend upon his acquired ideals. The social privileges and duties of the engineer of this age are exceeded in their scope and importance by those of few other professions. We are called upon to-day to do nothing less than rise to the level of the humanities and engineer in a skillful and sympathetic way many of the social problems of our time. These things we should attempt while not leaving the elementary duties undone.

There should never be any doubt in the mind of the client or employer as to an engineer's affiliations; or his unavoidable personal interest in matters he may be called to pass upon in a judicial capacity. His ability and willingness to devote all of his professional skill and attention to his employer's interests should never be in question. There should also be a clear understanding as early in professional life as possible, of the relative proprietary rights involved in ideas, designs and executed work, whether carried out under instructions or original performances.

The Engineer in Social Service

In relation to the public, the engineer must of necessity be a competent publicist at times and must exhibit a

professional consciousness and responsibility for all statements which may obtain general circulation and influence opinion and action. To this end the presentation and pre-discussion now possible within purely professional circles of topics of general interest are of great value and bid fair to secure for the profession a more generous recognition when as a body it appeals for public support in any cause.

The engineer who shows a high regard for professional obligation will also take a pride in conserving and advancing the interests of his fellow engineers, in giving credit solely where credit is due and in endeavoring to secure the best conditions in college, shop and business for raising the ability and the status of the profession at large.

Toward active participation in social service by the engineer, outside the narrow professional lines, various agencies are now operating largely assisted by Andrew Carnegie whose gift of the United Engineering Societies Building in New York has been a main factor in socializing the American Society of Mechanical Engineers and making its present forward movement possible. This is the industrial age and the Mechanical Engineers is the society of the industries. Some account of its recent developments is here given to point and illustrate the general tendencies already referred to.

Its members are scattered through every State in the Union, and their activities underlie a large part of our modern civilization and practically the whole of our industrial life. The advent of a monthly journal supplementing the annual volume of proceedings and of monthly meetings of the society in many of the large centers ranging from Boston to San Francisco has powerfully reinforced the former semi-annual meetings and increased their popularity. Student branches have also been established in twenty-four of our largest universities and colleges and supplement the tendency of the times to discourage the early specialization which deprives many young engineers of the general culture necessary for effective citizenship.

The Engineer's Service in the Labor Field

The bearing of these developments upon social service in the labor world is obvious. The mechanical engineer is more and more taking executive control of the industrial arts in the widest sense of the term. The engineering students and apprentices provide our future assistants, foremen, superintendents, plant engineers and managers. In the past their training has been severely technical and everything which broadens their sympathies and culture is a distinct social gain, particularly in the industrial sphere. By the circulation of literature and by visits and addresses from officers and members of the society, the professional ethics and social obligations of the mechanical engineer are brought effectively before the student at an early and formative stage of his career and create a lively interest in the wider aspects of his chosen profession.

Some of the topics which deeply concern young engineers are receiving the attention of committees of the American Society of Mechanical Engineers. Among these are public relations, conservation of natural resources, fire protection, safe construction and use of boilers, and economic administration of industrial establishments. The published monographs by members of the society on Safeguarding of Life in Theatres and Prevention of Accidents in Factories have had a wide circulation. Such contributions are certain to be greatly multiplied in the near future; and numerous other committees, though dealing with strictly technical subjects, are presenting reports of much general value.

Originally a society largely composed of men interested particularly in steam engineering and its related arts and sciences, the trend of industrial progress has greatly altered the complexion of the membership, a large part of which is now actively engaged in directing industrial plants of all descriptions. The socializing of the engineer and of the problems to which he applies his mind has been logically followed by the socializing of related industries. This is but the beginning of a far-reaching development. Already the technical and financial interests contributing to form ten large industries have been represented in strong committees of the society which will procure the effective presentation and discussion of all the problems of each industry, including those relating to labor, safety and sanitation. About thirty such committees in all will be organized.

*From a lecture delivered last month before Stevens Institute of Technology, Hoboken, N. J.

All the steps here outlined are recent and there is no doubt that the combined effect of the policy of decentralization in meetings and discussions and of expert concentration on specific industrial problems will be to place before long at the public service a body of authoritative opinion and practical sagacity which has been wanting in our industrial and social affairs for lack of suitable means of expression.

The Engineer and the Intellectual Life

If, as we know, engineers associated as such can accomplish much for their own and the public good, the individual engineer with a broad general culture grafted upon his professional education and practical discipline should make an ideal citizen and social being. His choice of interests is so great and many doors of thought which are permanently closed to other men are open to him and ready to yield energizing and pleasing ideas and suggestions. Do the facts correspond with the possibilities? We do not think so.

Many of the rank and file of our profession are still socially uninterested and uninteresting. Tolstoy sometimes wrapped his intellectual conclusions in a cloud of dreary and impracticable mysticism, but he scattered many jewels by the wayside. Here is a free translation from the Russian of one of them:

"In three ways we learn wisdom: by thinking—the noblest way; by imitation—the easiest way; and by experience—the most difficult way." Thinking, Imitation, Experience, the triple discipline of everyone who wins success in life.

The Measure of Success

Who gets more out of existence; the man who toils the livelong day and is too tired at night, he pleads, to do anything but sit silent and unoccupied, or witness the most frivolous amusements—or the man who has early taken pains to provide himself with intellectual resources? We have no quarrel with the lighter moods of life which we all need and enjoy, but we ask you at this stage to cultivate an adequate sense of proportion.

The United States was visited several years ago by a former Lord Mayor of London, a twentieth-century "Dick Whittington." If you acquaint yourself with his business career you will find that ever since he was a very small boy he had been kept hard at work in business of an uninspiring character and had risen through sheer doggedness and application. Yet you will also discover that this seemingly overworked business man, with none of your advantages in his youth, has cultivated a natural interest in letters and the fine arts to such an extent that he has become the author of two interesting books and a valued member of several exclusive literary clubs.

Again, there is a certain merchant, manufacturer and banker in our own country who has worked as hard under difficulties as the former example and who has prospered accordingly, yet he has found time to learn several languages besides his own, has compiled a polyglot-handbook and become an accomplished musician.

Now these two business men are typical of many others, and either of them might, with greater show of reason perhaps than any of us, have begged off from all such side interests. But they did not elect to do so, and both of them are happier and more useful and esteemed citizens of the world than they would have been had life consisted for them of little else than the pursuit of the mighty pound or dollar and been lived only in the byways that lead in that direction. The fact is that it is the men who are not slothful in business and in the professions who get much amazing interest returns on the investment of a little of their natural energy and scanty leisure in the pursuit of self-culture and in social service.

Mental Recreation

Consider the nature of the intellectual life to which, as we have seen, the keenest self-interest calls the ambitious engineer. An Elizabethan poet says:

"Absence of occupation is not rest,

A mind quite vacant is a mind distressed."

Rest is something more than the mere ceasing from toil—it is the complete emancipation of mind and body from business care. It is not simply "loafing" but "loafing" with an invitation to our souls, as Walt Whitman put it. Now it is this sphere which is claimed by the intel-

lectual life, for it is the life of the imagination, of the heart, of the spirit, and of the things of the spirit. It is the invisible Commonwealth which outlives the storms of the ages; the State whose armaments are thoughts; whose weapons are ideas and whose trophies are the pages of the world's masterpieces lying dusty and unopened on many library shelves. It is the realm of which a quaint old poet sang:

"My mind to me a Kingdom is,
Such perfect joy therein I find,
As far exceeds all earthly bliss."

It is at the age of forty that men are most prone to grow weary and stagnate and to fall back upon their mental reserves. Yet the fate of the intellectual preparation of the school and the college for a well-rounded mentality is practically decided within five years after graduation.

It is with good reason therefore, after emphasizing the human factors in executive success, that we ask the young engineer to make provision for the intellectual life, for that course of living which recognizes always and without ceasing the infinite value of the mind, which gives to its cultivation and enlargement a constant and enduring devotion and which clings to it through both the good and the evil days of professional life with a growing and abiding love.

The great majority of us, of course, cannot make intellectual improvement either our first, second or only aim. We must dig or delve with our hands or our minds and must bend our backs to the burdens laid upon them. We must all have food, clothing, shelter and a little more—yet the truth remains that we cannot really live by these alone and that at the end of our day of opportunity the person who has allowed his mental and higher powers to stagnate and decay has done so, not for want of time, but for lack of inclination.

Cultivation of the Imagination

The highest use to which we can put our minds is not mere logic, that indispensable but almost mechanical function of drawing conclusions from facts. The human intellect is best used when it is suffered to reach out beyond its own environment, and it is this imaginative faculty that most largely separates man from the lower animals and that also divides the higher from the lower order of men.

We all of us respect the multiplication table. It is possibly the only platform, political, social or religious upon which we can agree to stand, but he would be a curiously incomplete man to whose soul it would bring the elevation that comes from reading "Hamlet" or "In Memoriam" or St. Paul's eulogy of love. The thoughts that alone console and inspire the weary business man are assuredly not those called "practical" in the market place.

Even in the walks of science the demonstrated truth is not the whole truth, or the best truth. It was not by instrument or calculation, but by the scientific use of the imagination that Newton took the stupendous leap from a falling apple to a falling Moon. It was a great astronomer (himself the most exact of men) who said "Science only gives us hints of what by a higher method we come to know," and Wordsworth in his noble "Intimations of Immortality" has revealed in a flash to delighted generations the climax of the intellectual life, of those intuitions which lead us to "believing where we cannot prove."

"Oft in a season of calm weather,
Though inland far we be,
Our souls have sight of that immortal sea which
brought us hither,
Can in a moment travel thither,
And see the children sport upon its shore
And hear its mighty waters rolling evermore."

It is the true office of the intellectual life, then, of a man's deliberate reaching out for culture, to stimulate the higher faculties of the mind; to give it something of that perfection which is found in finely tuned instruments that need only to be touched to give back noble and responsive melody.

The annual meeting of the Milwaukee Metal Trades and Foundrymen's Association will be held at the Hotel Pfister Friday, February 14. The election of officers will follow the annual banquet.

Correspondence

Paint Efficiency and Paint Purity

To the Editor: In a recent article (*The Iron Age*, January 23) on mold-killed steel I incidentally referred to the fact that the paint trade is discovering that the purer a paint the poorer. This assertion of mine has been disputed. Probably there are many who would dispute it if they cared to take the time, or thought it worth while. And as at any rate good paint, and what makes it good, is an interesting and important subject to the iron trade, it has seemed well to me to refer those who are interested in it, yet who, like the writer himself, have not time to read it up very thoroughly, to two very excellent but brief and readable articles which, as far as I am able to judge, sum up present day paint practice and theory very comprehensively and clearly. One is "The Development of Paint Formulæ," by L. S. Hughes, in the *Journal of Industrial and Engineering Chemistry* for January, 1911; the other, "Paints for Metallic Structures," by Allerton S. Cushman. The latter is an official report to the Sixth Congress of the International Association for Testing Materials, and is reprinted in the *Chemical Engineer* for January, 1913.

These two papers attack the problem of paint efficiency from entirely different sides, and at the same time bear comforting and cheering testimony to the fact that the iron trade is not the only one in which strong difference of opinion exists; for our two authors not only differ radically in their conceptions of paint efficiency factors and fundamentals, but agree perfectly in that each negatives, or at least ignores completely, the conceptions of the other. And these differences of opinion can only partly be accounted for by the fact that the one author is dealing mainly with paints for wooden surfaces, and the other exclusively with paints for metallic surfaces.

What Determines Paint Efficiency

Hughes declares that modern paint research has demonstrated that the efficiency of a paint depends upon heterogeneity of structure and heterogeneity of composition; and although he is evidently considering more particularly paints for wood, yet it also appears that he is not excluding paints for iron or steel, and intends his doctrine to apply generally. Cushman, on the other hand, evidently (although he makes no definite statement to that effect) considers it unimportant whether a paint for metals be coarse or fine in structure, or both, and he moreover apparently considers it a matter of indifference whether such a paint be pure or not pure chemically (so long as the impurity be not a "stimulative" one). In his opinion the thing that counts most is the inhibitive character of the pigment, although he concedes, of course, much importance to (1) the excellence of the vehicle (but thinks no vehicle can stand indefinitely), and (2) the influence of the pigment on the vehicle. The fact that certain pigments inhibit and certain others stimulate metallic corrosion (and still others are neutral) in presence of air and moisture has been demonstrated by experiment, and whether these experiments will be confirmed under the somewhat dissimilar conditions of actual use in paints is being tried out by the Atlantic City practical experiments. When the vehicle starts to give way, the inhibitive action of the pigment is expected still to protect the steel.

As these two articles may not be easily accessible to all interested, let us give a little more fully their main points, all of which are probably essential, the apparent opinion of each author to the contrary notwithstanding.

Heterogeneity and Reliability

Hughes first of all rejects chemical composition as a factor in paint efficiency, and says: "Chemical analysis, even when correct, failed to account for the wide discrepancies observed in the behavior of paints of similar chemical composition." And his idea of paint quality may be summed up in one word, heterogeneity. Heterogeneity of structure, and heterogeneity of composition. With regard to the necessity of the former he has this to say: "The finer the major pigments in a paint the better, but there is advantage in the presence of a moderate portion of

distinctly coarser particles * * * to afford points for capillary action, thus increasing the thickness of the coat. * * * The remarkable consistency with which the fumiform or sublimate pigments outlasted their pulverized and precipitated competitors is strikingly indicative of the benefit of impalpable fineness and amorphous structure in the major pigment of a mix. * * * The recognized difficulty of securing satisfactory brushing with fumiform pigments only, proved easy of elimination by the employment of small amounts of coarser and crystalline pigments."

With regard to the heterogeneity of composition he says: "A citation of the records of condition of the white pigments used straight, as developed by their exposure at Atlantic City, is instructive in illustrating the fallacy of the doctrine of 'purity' as a criterion of reliability. * * * Without exception the individual pigments showed improvement in behavior when employed mixed with others. * * * So consistent was the improvement noted with increasing heterogeneity that the committees in charge of the experiment have made an unqualified declaration of the superiority of formulæ containing both lead and zinc in addition to mineral crystals." This at Atlantic City and Pittsburgh. Proved again at Fargo, where "it was conclusively demonstrated that mixtures of white lead and zinc oxide properly blended with moderate percentages of reinforcing pigments, such as asbestine, barytes silica, and calcium carbonate, have proved most satisfactory from every standpoint, and are superior to mixtures of prime white pigments not reinforced with inert pigments."

The Theory of Inhibitiveness

But the latest dictum in paint development is the declaration of Mr. John Dewar "that no one formula can prove satisfactory under all climatic conditions."

The other theory—the inhibitive theory of Cushman, the theory that it is not the heterogeneity but the inhibitiveness of the pigment that is of vital importance—is so simple and easily understood that his report to the International Association need not be quoted from in further elucidation of what has here been said. It is only necessary to add that the Atlantic City tests he quotes bear out the idea that it is more important that the pigment be inhibitive than that it be mixed. For, although these tests confirm to a certain extent what the experiments and authorities quoted by Hughes have apparently already amply demonstrated, that a mixed paint is better than a pure one—those of the pure ones not possessing inhibitive qualities showing wondrously poor in the Cushman experiments, and the mixed ones with but one exception rating high—yet the strongly inhibitive pigment paints, the chromates (American vermilion, chrome green, lead and zinc chromate, and zinc and barium chromate), sublimed white lead and the iron oxide stand at the very top.

Moreover, it is indicated by these experiments that the rule of heterogeneity applies only to the non-inhibitive and not to the inhibitive pigments. So it is only with certain pigments that Hughes' doctrine of heterogeneity (or the purer the poorer, as I have put it), holds good.

GEORGE AUCHY.

TACONY, PHILADELPHIA, February 6, 1913.

The Purchasing Agent's Problems

To the Editor: In your issue January 30, pages 310 and 311, is an article from the pen of John C. Jay, Jr., in which is rather a severe arraignment of the purchasing agent, although unquestionably not so intended.

The writer has rendered several years' service as a salesman and as a buyer. Some years ago he read a paper before the Western Railway Club of Chicago on "The Purchasing Agent," and if he remembers correctly the opening of the paper in question was to the effect that the purchasing agent should be selected for his duties with the same care that is supposed to characterize the board of directors in choosing the president of a corporation, and by this it was meant that the man chosen for the position of purchasing agent should be one whose temperament, experience and capacities fitted him especially for that line of work.

Each individual has an adaptation to some particular thing. There is one thing that he can accomplish better

than anything else. This applies to buying. It is unfortunate that in a large number of instances—it perhaps is not true in the majority of cases—those who appoint a purchasing agent are imbued with the idea that “anybody” can do the work, and compensation is generally on that basis. This reminds the writer of the story about the lady passenger on an Erie train years ago, who complained because the brakeman incoherently announced the names of the stations. The brakeman, overhearing her criticism, asked, “Madam, do you expect the Erie Railroad will furnish lunars at \$40 a month?”

The instance that Mr. Jay cites of a salesman selling two purchasing agents of the same railroad the same article at different prices, recalls an incident happening within the writer's experience some years ago, where a certain manufacturer sold his product to two different railroads, whose lines formed a through line between two western cities. The extreme western portion of the through line found it necessary to borrow some of that particular material from the eastern end of the line. Because of the delays in the western people getting their supply, they called on the eastern line to make charge covering the material furnished, and then correspondence ensued relative to the fact that the eastern line had overcharged them. Subsequently it developed that the manufacturer in question had made “fish” of one and “flesh” of the other, and I think he has never sold either property a dollar's worth of goods since, although this happened several years ago.

The writer recalls in his experience as buyer that some years ago he asked a salesman for a price on a certain article, but before the salesman could quote the price he was obliged to ask the writer the “name of his road.” Having had some experience as salesman, the writer very quickly grasped the situation, and that manufacturer has never sold the writer a dollar's worth of goods since, as it was manifest that he had no price on his goods except one, and that was all he could get.

In these days when the manufacturers of a great many articles that railroads use have a greater or less number of “gentlemen's agreements,” the writer has felt that it would be to the advantage of the railroads if the purchasing agents were likewise members of a similar body; but so far as has come within the writer's knowledge, there is no such interchange of prices among railroad purchasing agents. For some years the writer sold various supplies to railroads, and it was never necessary for him to ask the name of the railroad before he could quote the purchasing agent prices on the articles he had for sale, since the prices were uniform to all railroads alike.

Business conditions to-day are vastly different from those of some years ago. The salesman on the road to-day, who is thoroughly familiar with the details of the product he is selling, is the rare exception; whereas, prior to the present period of the so-called “salesmen's instruction schools” the salesman was valuable to his employer and to the purchaser alike, through the practical information that he had relative to the details of the articles he sold. The tendency of present trade conditions is to depreciate the salesman through destroying his personality; the value of his services to the buyer is lessened because of the salesman's lack of actual information concerning his product. This statement is a broad one, and covers not only the unfortunate who is obliged to spend much of his time in sleeping cars and hotels of indifferent accommodations, but the salesman one meets in entering the ordinary business house for an individual purchase. Unfortunately the average person loses his identity the moment he enters the employ of the average business house of to-day, and instead of being “Mr. Brown” or “Frank Brown” he is No. 1962; and instead of being encouraged to learn the business and be carried along with its development, the trend of conditions as they are to-day is the absolute reverse.

It is an acknowledged fact, without regard to the line of occupation, that good material to-day is very scarce, and it is largely because of the fact that in the case of the majority of the people available for service, instead of coming in from the country, as they did years ago, and where every young fellow had to learn to work, the supply to-day is from the cities where the trend of education has been to do nothing, and “let father foot the bills.”

Employers could do much to counteract this, and the writer believes not only to their profit, but for the good

of the public at large. A volume could easily be written on this subject.

In conclusion: A railroad buyer has a great many conditions to meet, and the instances are rare wherein he has the opportunity to follow his best judgment in his purchases.

IRA C. HUBBELL,

Kansas City, Mexico & Orient Railway Company.
KANSAS CITY, Mo., February 8, 1913.

The Wire Rod Mill at Rankin, Pa.

A German Engineer's Favorable Comment on Its Construction and Efficiency

Stahl und Eisen for January 9, 1913, contains a short and appreciative article on the wire rod mill of the American Steel & Wire Company at Rankin, Pa., written by F. Trappiel, of Breslau, who says that on account of its efficiency and the excellence of its product it takes a foremost place among the wire rod mills of this country. The mill is described in detail with the help of a plan, and the course of the rod followed from the billet to the reels. It is pointed out that three sizes alone are rolled—0.212 in., 0.232 in. and 0.252 in. in diameter; also that the mill is not a modern one in the sense that it was originally designed for high efficiency, but has been gradually built up and new arrangements added as their merit has been proved.

The record outputs for the mill are given at 263, 275 and 308 tons respectively, in 11½ hrs. for the three sizes of rod. The average output per shift for the 0.212 in. rod is 235 to 245 tons, and special attention must be called to the fact that the surface of the finished rod is in excellent condition. Attention is also drawn to the small amount of scrap, which is said to be not more than 0.75 per cent. on the average per shift. This is due to several conditions, the first of which is that only very good billets are used, and second, that the rollers are extremely careful, attentive and skillful. A detailed list is then given of the classes of labor used in the mill, the total being 45 men on the day turn and 43 men at night. The work requires continuous attention, and those positions are indicated where the men work through the whole shift with no stop, except such as is provided by the mill shutting down.

The rolls are changed at 8 in the morning and evening, the time required being 20 minutes, or at the most 35 minutes. The intermediate and finishing rolls are changed each shift, the others only when it is found necessary. Trials are made with three small billets, weighing about 50 lb., the time required being from 10 to 15 minutes, so that by 8:45 morning and evening the mill is again in full operation. Mention is made of the excellent business the mill enjoys and consequently the few days on which it is down; also of the wages paid the rollers, which the writer considers to be very good even for American conditions, ranging up to \$4.50 per 100 tons.

The very high efficiency of the mill is especially noticeable, when comparison is made with the possible output. For instance, with rolls 11.8 in. dia., 520 r.p.m., and delivering on the average five finished rods at once, the theoretical hourly production is 26.45 tons, which equals 304.18 tons in 11½ hours. If 240 tons is taken as the average output per shift then the efficiency is 78.9 per cent. The ratio between power used and output is also very good, namely 4000 hp.: 240 = 16.68 or for a 5 mm. rod, 4000: 205.3 = 19.5. This is only slightly below the figures for the thoroughly modern, continuous rod mill at Eschweiler, which equals 17.6. The output per man is also worthy of mention, namely 240:45 = 5.34, or 205.3: 45 = 4.56 tons. In only a very few German rod mills can this output be secured.

G. B. W.

R. B. Charlton, general superintendent of the Milwaukee (Bay View) works of the Illinois Steel Company, on February 1 posted the following notice: “An advance of wages of employees of the Milwaukee works of the Illinois Steel Company was made effective February 1. The wages of day laborers will be increased from 17c. to 19½c. per hour, or 25 cents per day. Many other wage rates, not including tonnage rates, also are advanced. The employees receiving the lowest rates of wages will receive the largest benefit from the advance.”

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Experimental Tariff Making

Unless all reports coming from Washington are without foundation, the country is to see a totally different method of constructing the tariff from that which has prevailed for the past fifty years. In that time our law makers have been steadily approaching a more scientific basis in dealing with duties on imports than when the tariff was revised wholly and completely under the so-called system of "log rolling." It had been in fact expected that with the growth of experience in dealing with tariff matters, and also with the sincere efforts to separate the tariff from politics, the time might come when no revision would be undertaken without a thorough inquiry by a tariff commission or other experts.

All the experience of the past half century now seems to have been thrown to the wind. Those who have been intrusted with national legislation, and who are preparing a revision of the tariff for enactment at the approaching extra session of Congress, appear to have embarked on a course of experimenting. Instead of taking the advice of experts who have given their earnest attention to questions of tariff duties, so as to provide the largest amount of revenue with the least disturbance to our manufacturing industries, the effort seems to be to provide increasing revenue from imports by the scheme of lowering duties sufficiently to permit the inflow of a larger volume of manufactured products and thus bringing about greater benefit in this manner to the national treasury. The interests of manufacturers, instead of being safeguarded to any extent, are to be wholly disregarded. One of the most interesting points in this connection which has made its way from Washington through the columns of the daily press is that the tariff revisionists are contemplating the almost complete abandonment of the free list. They propose that hardly an import of any kind is to escape a small tax. It is stated that their policy will be to levy a duty on practically everything, but "to reduce the tariff enough in all cases to give the foreign manufacturer a chance to compete on even terms in this country with the American manufacturer."

If such a course as this is pursued, the country will face a complete revolution in methods of tariff making. In every recent revision of the tariff, the free list has been extended a little farther. At the present time our imports free of duty are very greatly in excess of anything known in our history. It might be supposed that this would please a free trader, as it would seem that thus the country was steadily making an advance toward free trade. The present tariff revisionists, however, seem not to be willing to approach a free trade basis in this way, but propose to put a duty on all raw materials now coming in free and at the same time reduce the duty on imports manufactured from those materials, thereby giving the American manufacturer who uses such materials a double handicap in meeting the competition of foreign manufacturers enjoying much cheaper labor. How American manufacturers in such branches of industry will be able to meet a competition of this kind, unless they can secure much cheaper labor, is a problem. The gentlemen who are framing the new tariff bill, however, apparently care nothing for the American manufacturer and those who are employed by him. Their aim is ostensibly to secure larger revenues from imports, but it would seem as if they were animated by some feeling

of hostility toward our manufacturing interests and all connected with them.

It is difficult to reconcile the views of the various advocates of lower duties. One set of such advocates insist that the lowering of duties will assist our manufacturers by removing from them the tariff shackles and bidding them go forth into the markets of the world and secure a wider field for their products. On the other hand, we have the revisionists, as indicated above, who would hamper our manufacturers by increasing the cost of their raw materials and giving foreign manufacturers greater opportunities for entering the markets of the United States.

No matter what the opinions of the revisionists may be, however, one thing is certain and that is that every effort is to be made to increase the difficulties with which American manufacturers have to contend. The market of the United States is the richest in the world, and foreign manufacturers are apparently to be given an opportunity, which they have long sought unsuccessfully, of entering it to their great advantage.

While such a bill as the tariff revisionists now have in view may be forced through the House of Representatives exactly as it comes from the hands of its makers, there is hope that it will encounter an obstacle in the Senate. While that body, as it appears, will have a Democratic majority after March 4, it may be that among that majority will be found enough resolute patriotic men, faithful to American interests, who will refuse to follow the experiments undertaken by our new leaders in tariff revision. The country should not despair even if a bill of the character above indicated receives the seal of approval from the House of Representatives. The Senate, as in the past, may prove to be an impassable barrier.

Workmen's Compensation in Minnesota

In Minnesota the legislature is now wrestling with a workmen's compensation law and it is probable that some act covering compensation for injuries will be passed this winter. The two other Lake Superior States in which mining is carried on have such acts. It is probable that the Minnesota law will not be designed with an eye to the interests of the employer as is that of Michigan, and that the compensation to be afforded will be greater. Even then, the sums paid out by employers will doubtless be less than are now expended, while the benefit to employees will be far greater than at present. The damage suit lawyer has become a terrible handicap to honest workingmen in Minnesota, and the methods employed by some of these attorneys are disgraceful. Not only do some of these lawyers have agents throughout the mining regions whose business it is to drum up trade, but they are said to have certain obscure hospitals to which men are taken and where they are put in the best condition for making an impression on the juries, so that when brought into court they will be able to make a strong plea on account of their appearance, doctored up for the purpose. These cases are usually taken for one-half the winnings, frequently half the gross proceeds, and injured men have been known to come out from the clutches of their attorneys with nothing, or less, as the net result of the settlement. Mining companies deprecate all this, and are inclined to settle on a higher basis when there is no intervention on the part of such attorneys. Of course, not all lawyers who handle personal injury cases are of the type referred to, but too many are.

Eastern Railroad Labor Troubles

The Eastern railroads, comprising the lines serving the whole of the northern part of the United States extending from the Atlantic Ocean to Chicago and as far south as the Potomac and Ohio rivers, are confronting a most serious situation. For several weeks they have been endeavoring to placate the firemen who insist on an increase in their payroll amounting to 35 per cent. This increase is considerably more than was demanded by the locomotive engineers, who agreed to arbitration in the settlement of their demand for an advance. The firemen have not had their demand absolutely refused but the railroads have expressed a willingness to submit the matter to arbitration under a similar arrangement to that adopted in connection with the demand of the engineers. The firemen have declined to accept such an arbitration, stating that they will only arbitrate under the provisions of the Erdman act. The railroads claim that this means the placing in the hands of one man this great wage problem. In their opinion it is by far too big a proposition to be handled by any one man. They claim that such procedure would not protect the interests of the public, the railroads or the employees.

The gravity of this situation lies not merely in the demand which comes from the firemen, but in the further fact that as soon as this question is settled it is probable that the trainmen and conductors in the same territory will also demand increased wages. In fact, representatives of these men have notified the managers of the railroads that it is their intention to do so as soon as possible.

The railroad companies should have the support of public opinion in this contest with their employees. They have been prevented from securing any benefit from the great increase in the business of the country except only so far as they have been favored with increased traffic. Manufacturers have been able to advance their prices as the volume of business grew, and have thus secured larger profits, enabling them to increase their reserve funds so that they will be in better position to endure any depression in business which may come upon them. The railroad companies, however, are obliged to handle their business without the ability to secure adequate reserves, and in addition to this are now compelled to meet the necessity for increasing their cost of operation by greatly advancing the wages of their employees. It would seem as if after the firemen secure an advance, after the trainmen and conductors secure their advance, other employees such as telegraphers, tower men, station agents, section hands and track walkers will insist on receiving more money. It is easy to see why the railroad companies are unwilling to accede at once to the demands of the firemen and they show a more than liberal disposition by offering to submit this matter to arbitration.

If the firemen who have the past week voted almost unanimously in favor of a strike should carry out this purpose and endeavor to tie up all Eastern railroads, the public should endeavor by every means in its power to bring influence to bear on the strikers to reconsider their decision and return to work. The railroads have evidently placed their backs to the wall, as they state that if the leaders of the firemen call out the men steps will immediately be taken for the operation of trains under strike conditions. The result of such a state of affairs would be deplorable. The business of the most populous and most important manufacturing section of the United States would be com-

pletely dislocated. Not only would many thousands of men now connected with the operation of railroads be thrown idle, but numerous manufacturing establishments and other enterprises employing large numbers of persons would be obliged to close, thus bringing about a condition of idleness to many more thousands. It is almost inconceivable that this should occur. The responsibility is directly on the firemen and they should weigh well the consequences of a strike of such momentous importance.

Costly Failures on Delivery Promises

The need of close co-operation between the sales and shop department heads has been discussed over and over, but there are some things that must be said again. The most vexing problem with which both have to deal is that of making deliveries on contract time. A recent experience of a machine tool manufacturing concern may be cited, which is unfortunately so common that many who read of it may imagine that it applies to their individual plants. An outside salesman had wired his firm, asking when a certain machine tool could be delivered. The superintendent was called in. After considerable figuring he advised that 90 days was the lowest estimate he could make. The sales manager, in an effort to aid his salesman, gave him authority to cut this delivery date to 60 days, which was the time promised by a competitor; and in order to meet another competitor, the outside salesman, on his own account, made a further reduction to 45 days.

The order was booked, and owing to an unfortunate delay in securing the castings, it was something over four months before the machine was shipped. The customer, who was a large buyer of machine tools, made a claim for damages that might or might not have been a just one. In order to retain his patronage, concessions were made that more than ate up the profits.

While this question has been brought up at many meetings of the National Machine Tool Builders' Association, no headway was made on it, and little can be until the manufacturers themselves all agree to curb the natural overzealousness of salesmen—a fault, if it is one, for which the manufacturers themselves are largely to blame.

With the average American manufacturer the question is even more serious in export business than in dealing with domestic customers. The expansion of the export trade depends to a very large extent on the ability of the seller to make shipments on contract time and his honesty in making and meeting promises. An experience of an export machinery house may well serve as a lesson. In this particular instance the salesman, who was in Mexico, found a customer who was willing to pay a bonus in order to get delivery of the machinery and equipment needed to take off his sugar cane crop. The salesman wired full particulars to his firm, giving delivery dates promised by German and English competitors. Without consulting the shop production heads, the export manager replied, naming a delivery date 30 days better than the earliest promised by foreign competitors. The machinery arrived several months behind time, resulting in a damage suit that cost the exporter approximately \$15,000 on a \$28,000 order.

We have cited an isolated case, but unfortunately it is typical of a good many in containing the reason

why a good many American manufacturers lose foreign business to European competitors who are more careful in making and keeping promises of shipments.

Sloss-Sheffield Company Improvements

In a statement made at New York last week President J. C. Maben of the Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., thus referred to improvements that company will make: "We have plans under way that will involve the expenditure of about \$500,000 on the property. We will put in several new coal and ore washers and expect to open up a new coal mine in the current year. These outlays will be made out of the earnings of the company, in addition to the regular depreciation fund. The property is in good condition and we are much pleased with the earnings being shown on the coal mined, which is bringing better prices than for some time. Earnings for January were about on a parity with December when they ran at the rate of approximately 7 per cent. on the common stock, after deducting preferred dividends, depreciation and interest charges."

Of conditions in the Southern iron market Mr. Maben said: "The demand for iron is very light—in fact, smaller than at this time last year. This is due to the uncertainty of business as to what the tariff measure will be. Consequently, iron companies are accumulating stocks of pig somewhat, although the reserves do not nearly equal those of a year ago. On account of the small demand there is no disposition to reduce prices, which remain firm."

Decline in Steel Corporation's Unfilled Orders

The United States Steel Corporation's subsidiaries had on their books on January 31 a total of 7,827,368 tons of unfilled orders, or 104,796 tons less than on December 31. In December there was an increase of 79,281 tons, in November an increase of 258,502 tons and in October an increase of 1,042,874 tons, the largest on record. The last decrease preceding that of January was in March, 1912, and amounted to 49,359 tons. Previous to March there has been unbroken increases from May, 1911. The unfilled tonnage statement of the Steel Corporation is given below by months, since the beginning of 1911 and previous to that by half-year periods:

January 31, 1913....	7,827,368	April 30, 1911.....	3,218,704
December 31, 1912....	7,932,164	March 31, 1911.....	3,447,301
November 30, 1912....	7,852,883	February 28, 1911....	3,400,543
October 31, 1912.....	7,594,881	January 31, 1911....	3,110,919
September 30, 1912....	6,351,507	December 31, 1910....	2,674,757
August 31, 1912.....	6,163,375	June 30, 1910.....	4,257,794
July 31, 1912.....	5,957,079	December 31, 1909....	5,927,031
June 30, 1912.....	5,807,346	June 30, 1909.....	4,057,939
May 31, 1912.....	5,750,983	December 31, 1908....	3,603,527
April 30, 1912.....	5,664,885	June 30, 1908.....	3,313,876
March 31, 1912.....	5,304,841	December 31, 1907....	4,624,552
February 29, 1912....	5,454,200	June 30, 1907.....	7,603,878
January 31, 1912....	5,379,721	December 31, 1906....	8,489,710
December 31, 1911....	5,084,761	June 30, 1906.....	6,809,850
November 30, 1911....	4,141,955	December 31, 1905....	7,605,086
October 31, 1911....	3,694,328	June 30, 1905.....	4,829,635
September 30, 1911....	3,611,317	December 31, 1904....	4,696,203
August 31, 1911....	3,584,085	June 30, 1904.....	3,192,277
July 31, 1911.....	3,695,985	December 31, 1903....	3,215,123
June 30, 1911.....	3,361,058	June 30, 1903.....	4,666,578
May 31, 1911.....	3,113,187	December 31, 1902....	5,347,523

According to the Post Office Department, 40,000,000 parcel post packages were handled in January, the first month the system was in operation. These figures are based on the amount of business done at the 50 largest post offices where about one-half of the postal business of the United States is handled. The statement of the Post Office Department then continues: "It is believed that the amount of parcel post business will increase at a tremendous rate within the next few months. Parcel post funds are already exhausted, and Postmaster-General Hitchcock has asked Congress for a joint resolution appropriating \$750,000."

At the annual meeting of the Quinn Wire & Iron Works, Boone, Iowa, it was decided to add to the present lines of manufacture the making of wire fencing. C. C. Quinn, W. W. Quinn and J. H. Rickenberg were elected directors for the ensuing year.

Pittsburgh and Vicinity Business Notes

The Pittsburgh Gage & Supply Company, Pittsburgh, has elected the following officers: W. L. Rodgers, president; Edward T. Dravo, vice-president; R. F. Ramsey, treasurer; A. F. Maxwell, assistant treasurer; R. F. Blair, secretary; F. J. Teufel, auditor; E. J. Checkley, superintendent. The directors are A. Dempster, Edward T. Dravo, W. B. Rodgers, Edward McDonald, C. E. Beeson, W. L. Rodgers, R. F. Ramsey.

Samuel Trethewey & Co., Ltd., Pittsburgh, manufacturers of solid steel shear knives, are in the market for a number of lathes, planers and other machine tools.

The American Steel & Wire Company, Cleveland, Ohio, has placed an order for an 8,000,000-gal. steam turbo-pumping unit with the Wilson-Snyder Centrifugal Pump Company, Pittsburgh. The pump is driven by a 275-hp Kerr Economy steam turbine, operating at 3600 r.p.m., through a Wuest herringbone gear made by the Falk Company, Milwaukee. The turbine operates at standard alternator speed at maximum economy and the pump at a speed of 1400 r.p.m., which permits of highest efficiency on the water end.

The six-story brick building at new Grant street and Seventh avenue, Pittsburgh, formerly occupied by the Bindley Hardware Company, has been leased to the Henry W. Oliver estate, and will be converted into a power building.

The Hay Walker Brick Company, Pittsburgh, has been organized with a capital stock of \$1,000,000 to take over the building brick department of the Harbison-Walker Refractories Company. Hay Walker is president, Edward E. McCoy secretary and treasurer and C. J. Henderson Eastern sales manager.

The Sharon Foundry Company, Sharon, Pa., has re-elected W. W. Shilling president and Thomas Kennedy secretary and treasurer. Directors were also re-elected as follows: W. W. Shilling, J. E. Wood, Robert McIntyre, Joseph Riddell, Thomas Kennedy, H. P. Forker, James H. Whitla, William A. Wallis and George L. Collard.

The Duff Mfg. Company, manufacturer of Duff hydraulic jacks and other specialties, is now occupying its new plant on Preble avenue, North Side, Pittsburgh. The main building is 125 x 600 ft.

The strike at the Rankin and Braddock works of the American Steel & Wire Company, which at one time threatened to be serious, has completely collapsed and the old men are returning to work as fast as places can be found for them. Some of the leaders in the strike will not be taken back. Attempts of officers of the American Federation of Labor to extend the strike to other plants of the American Steel & Wire Company and the Carnegie Steel Company were unsuccessful.

The Vitrolite Sanitary Construction Company, Pittsburgh, has taken out a Delaware charter with a capital stock of \$50,000, to manufacture, sell and deal in vitrolite, mosaic, marble, etc. The incorporators are Edward J. Detrick and Charles M. Detrick of Pittsburgh and Robert Ernst of Detroit, Mich.

The Federal Enameling & Stamping Company, with a capital stock of \$150,000, has been organized at Pittsburgh to take over the plant of the Star Enameling & Stamping Company at McKees Rocks, Pa., which has been idle for more than two years. The property includes six acres and the plant has 115,000 sq. ft. of manufacturing floor space. The new company will manufacture enameled kitchen ware.

The Westinghouse Electric & Mfg. Company, Pittsburgh, has established repair shops in New York, Philadelphia, Pittsburgh, Chicago, Seattle, San Francisco and Los Angeles for the purpose of making prompt and thorough repairs to electrical apparatus of all kinds.

The Simonds Mfg. Company, Pittsburgh, has taken out a permit for a brick addition, 75 x 100 ft., to its pattern warehouse.

The plant of the Penn Motor Company, New Castle, Pa., was sold last week for \$400 more than the \$50,000 mortgage on the plant, the purchasers being George Roth and J. M. Jack of Pittsburgh. It is not known whether the plant will be put in operation.

The annual meeting of the mechanical section of the Engineers' Society of Western Pennsylvania was held last week in its rooms in the Oliver Building, Pittsburgh.

George H. Neilson was elected chairman; R. S. Feicht, vice-chairman, and O. P. Hood, J. A. Hunt and W. E. Fohl, directors. W. E. Snyder, the retiring chairman, delivered an address on "The Technical Man and the Steel Works." He showed how the increasing demand for technical knowledge in the manufacture of steel makes it necessary for many places to be filled by men of technical training, which a few years ago could be held by workmen trained in the mills. Mr. Snyder is mechanical engineer of the American Steel & Wire Company.

The annual meeting of stockholders of the Wheeling Mold & Foundry Company was held in Wheeling, W. Va., last week. Directors were elected as follows: C. E. Blue, L. V. Blue, C. H. Copp, B. W. Peterson, C. C. Woods, F. duPont Thompson and H. M. Russell. Reports were submitted showing a large volume of business transacted in the past year. It was reported that the work being done by the company for the Panama Canal is almost completed. Extensive improvements and additions have been made to the company's plant in the past year, and now it is one of the largest of its kind in the country. The prospects for the ensuing year are exceedingly bright, having orders ahead for six months.

The New Publication of the American Iron and Steel Institute

The first number of the Monthly Bulletin of the American Iron and Steel Institute, issued from the institute offices, 30 Church street, New York, appeared last week. It is magazine size, 7 x 10 in., and consists of 32 pages and a cover. James T. McCleary, secretary of the institute, is editor, and Dr. Thomas Darlington, secretary of its welfare committee, and Howard H. Cook, its assistant secretary, are associate editors. In typographical dress and illustration the Bulletin is most attractive, and in this first issue are a number of conspicuous articles which give good promise for the usefulness of the publication. First place is given to a contribution by Dr. Darlington on "Model Yard Conditions at the Bethlehem Steel Company's Works." A dozen fine views of mill surroundings at South Bethlehem tell a striking story of what has been done to improve yard conditions. They represent the acme of millyard cleanness and ornamentation through the employment of grass plots and flower beds. Another feature article, which is by Charles L. Close, manager of the safety and welfare work of the United States Steel Corporation, describes the work and organization of the committees on safety and sanitation of the corporation and its subsidiaries.

Iron Ore Analysis for 1913

Oglebay, Norton & Co., Cleveland, Ohio, have published their analysis book for the iron ores they will ship in the season of 1913. In addition to the ores of the Gogebic, Menominee and Mesaba ranges which appeared in the list of 1912 are a number of new ores, including the Carson, Seneca and Susquehanna from the Susquehanna mine on the Mesaba range, and the Cavour and Oxford No. 2, from the same range. Instead of the Hobson and Lawrence ores from the Montreal mine, Gogebic range, as in 1912, three ores are to be shipped from that property—the Hamilton, Lawrence and Montreal. Moose Mountain briquettes made by the Grondal process from Moose Mountain ore mixed in Ontario, Canada, are now 2½ x 3 x 6 in., instead of 3 x 3 x 6 in., as in 1912. These briquettes run 64.68 per cent. iron, 0.017 phosphorus, 4.74 silica, 0.72 alumina, 1.15 lime, 1.14 magnesia and 0.008 sulphur, as against 62 per cent. iron, 0.025 phosphorus, 8.09 silica, 1.52 alumina, 2.31 lime, 2.22 magnesia and 0.014 sulphur, as in 1912.

The Iron and Steel Institute will hold its annual meetings at the Institution of Mechanical Engineers, Storey's Gate, Westminster, London, England, on Thursday and Friday, May 1 and 2, 1913. The Bessemer gold medal will be awarded to Adolphe Greiner, general director of the Société Cockerill, Seraing, vice-president of the institute. The annual dinner will be held at the Hotel Cecil, May 1. The autumn meeting will be held at Brussels, at a date to be announced later.

The Iron and Metal Markets

Strength in Finished Steel In Spite of Weakness in Raw Material Arrears Still the Chief Concern of the Mills— Pig Iron Lower in All Markets

Continued weakness in pig iron and further declines in coke and old material are still accompanied by very firm conditions in finished steel. The recession in the rate at which new orders are coming in for rolled material has been so gradual and the total on the books of the mills is so enormous that there are still some leaders in the industry who expect to see the present rate of output extend well into the second half. There are others who give greater significance to the factors that have caused hesitancy among buyers of pig iron.

The decline of 104,000 tons in unfilled orders of the Steel Corporation in January was in line with the lessening of the accumulation shown in the two months preceding. From the record increase of 1,042,000 tons in October there was a drop to 252,000 tons increase in November and to 79,000 tons in December, indicating that October was the culmination of the movement and that buyers are now concerning themselves more in getting what they have contracted for than in providing for far-off and uncertain wants.

At the same time the mills are recognizing that their great problem is to reduce arrears in deliveries and in some cases where business is offered for the second half are not disposed to make a more definite promise than "at the convenience of the mill."

Railroad buying at least is not flagging. Late rail orders include 6000 tons for the Soo Line, 9000 tons for the Chicago & Eastern Illinois, 7000 tons for the Chicago, St. Paul, Minneapolis & Omaha, 5000 tons for the C., B. & Q. and 10,000 tons additional for the Great Northern. For the cars on which bids have been asked lately, it is estimated at Pittsburgh that 600,000 tons of plates and shapes will be required, this figure including the material for 12,300 Pennsylvania Railroad cars which have just been placed.

Plate, structural and bar mills see no indication of anything but full occupation for five or six months. The few plate mills that have not sold far ahead are steadily booking business because of failure of deliveries on contracts. At Philadelphia 25,000 tons of vessel plates are represented in recent inquiries, including plates for two new vessels for Atlantic-Pacific trade, to be built at the Cramp yards. One inquiry for 10,000 tons of plates for bridge work is up in the same market. For the Passaic Valley sewer in New Jersey, for which bids are opened this week, 20,000 to 30,000 tons of riveted plates will be required if steel pipe is chosen rather than cast iron.

For the second Queens section of new elevated railroad work the American Bridge Company has taken 24,000 tons at New York. A Broadway subway section, also to be built by the city, comes up next, requiring 12,000 to 14,000 tons. These lettings of city work are only a fraction of the total held up in New York by the delay over subway operating contracts. Recent competition on building work in New York has been sharper, some fabricators having cut \$1 to \$2 below \$50 a ton.

A feature of bar business in the East is an easier market for bar iron, \$1 to \$2 having come off the premiums recently secured.

Rumors of a further advance in wire products have no better basis than the fact that a minor company in the Pittsburgh district asks \$1.80 for wire nails after selling its output for several months ahead.

In the sheet and tin plate trades the fear that some mills cannot make full deliveries in view of the difficulty in getting sheet bars has hurried forward orders that ordinarily come later to the mills. Considerable additional business for the second quarter has been booked lately.

Consumers of foundry pig iron are still well content to wait. The decline has been about 50 cents from the December level in most markets. While it is asserted that concessions do not signify, where demand is so small, it is probable that the beginning of any new buying movement would be marked by even lower prices, the extent of the movement determining whether advances could be established later.

Weakness in foundry iron in the Central West is due in part to the continued offering of Southern No. 2 iron at \$13.50, Birmingham, and even lower. At Cleveland and Valley furnaces \$17 for No. 2 is now the market. In Northern iron at Chicago competition has been keener.

At Pittsburgh an inquiry for 6000 tons of basic iron has brought quotations of \$16.35 to \$16.50 at Valley furnace, but no buying is reported.

The decline in coke, as was to be expected, is as spectacular as the advance. Prompt coke has sold at \$2.30 at ovens and \$2.50 is predicted for first half contracts, against \$3 to \$3.25 for such contracts in the late months of 1912.

A Comparison of Prices

Advances over the previous week in heavy type, declines in italics

At date, one week, one month and one year previous.

	Feb. 12, 1913.	Feb. 5, 1913.	Jan. 15, 1913.	Feb. 14, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia	\$18.25	\$18.50	\$18.50	\$14.85
Foundry No. 2, Valley furnace	17.00	17.50	17.50	13.00
Foundry No. 2, S'th'n, Cin'ti..	16.75	16.75	16.75	13.25
Foundry No. 2, Birmingham, Ala.	13.50	13.50	13.50	10.00
Foundry No. 2, furnace, Chicago*	17.25	17.50	18.00	14.00
Basic, delivered, eastern Pa....	18.00	18.00	18.00	14.25
Basic, Valley furnace	16.35	16.35	16.35	12.25
Bessemer, Pittsburgh	18.15	18.15	18.15	14.90
Malleable Bessemer, Chicago*	17.25	17.50	18.00	14.00
Gray forge, Pittsburgh	17.15	17.15	17.15	13.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	16.00
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh...	28.50	28.50	28.50	20.00
Open hearth billets, Pittsburgh	29.00	29.00	29.00	20.00
Forging billets, Pittsburgh.....	36.00	36.00	36.00	28.00
Open hearth billets, Philadelphia	32.00	32.00	32.00	22.40
Wire rods, Pittsburgh.....	30.00	30.00	31.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.25	16.25	17.50	15.00
Iron rails, Philadelphia	18.00	18.00	18.00	16.00
Car wheels, Chicago	16.75	16.75	17.25	13.00
Car wheels, Philadelphia.....	15.50	16.00	16.25	12.00
Heavy steel scrap, Pittsburgh..	14.25	14.50	15.00	12.25
Heavy steel scrap, Chicago....	12.25	12.25	12.75	10.50
Heavy steel scrap, Philadelphia..	13.00	13.50	14.50	11.75
Finished Iron and Steel,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.67½	1.67½	1.77½	1.27½
Iron bars, Pittsburgh	1.70	1.70	1.70	1.25
Iron bars, Chicago	1.60	1.60	1.57½	1.15
Steel bars, Pittsburgh, future..	1.40	1.40	1.40	1.15
Steel bars, Pittsburgh, prompt..	1.70	1.70	1.70	1.31
Steel bars, New York, future..	1.56	1.56	1.56	1.31
Steel bars, New York, prompt..	1.86	1.86	1.86	1.31
Tank plates, Pittsburgh, future.	1.45	1.50	1.50	1.12½
Tank plates, Pittsburgh, prompt	1.70	1.75	1.75	1.12½
Tank plates, New York, future	1.61	1.66	1.66	1.28½
Tank plates, New York, prompt	1.86	1.91	1.91	1.28½
Beams, Pittsburgh, future.....	1.45	1.50	1.50	1.12½
Beams, Pittsburgh, prompt.....	1.70	1.75	1.75	1.28½
Beams, New York, future.....	1.61	1.66	1.66	1.28½
Beams, New York, prompt.....	1.86	1.91	1.91	1.28½
Angles, Pittsburgh, future.....	1.45	1.50	1.50	1.12½
Angles, Pittsburgh, prompt.....	1.70	1.75	1.75	1.28½
Angles, New York, future.....	1.61	1.66	1.66	1.28½
Angles, New York, prompt.....	1.86	1.91	1.91	1.28½
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.12½
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.20
Steel hoops, Pittsburgh.....	1.60	1.60	1.60	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Rods and Wire,

	Feb. 12, 1913.	Feb. 5, 1913.	Jan. 15, 1913.	Feb. 14, 1912.
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 28, Pittsburgh	2.35	2.35	2.35	1.85
Wire mesh, Pittsburgh	1.75	1.75	1.75	1.60
Cut nails, f.o.b. Eastern mills	1.80	1.80	1.75	...
Cut nails, Pittsburgh	1.70	1.70	1.70	1.55
Fence wire, galv'd, 0 to 9, Pgh.	1.55	1.55	1.55	1.40
Barb wire, galv., Pittsburgh	2.15	2.15	2.15	1.90

Coke, Connellsville, Per Net Ton, at Oven:

Future coke, prompt shipment	\$2.50	\$3.00	\$4.00	\$1.80
Future coke, future delivery	2.50	3.00	3.25	1.80
Foundry coke, prompt shipment	3.50	3.50	4.50	2.10
Foundry coke, future delivery	3.50	3.50	3.75	2.20

Metals,

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	16.00	16.50	17.25	14.37½
Electrolytic copper, New York	15.75	16.25	17.00	14.25
Spelter, St. Louis	6.55	6.60	7.10	6.55
Spelter, New York	6.50	6.75	7.25	6.70
Cast. St. Louis	4.20	4.20	4.20	3.97½
Cast. New York	4.35	4.35	4.35	4.00
Antimony, Hallett, New York	49.30	48.75	51.00	44.00
Tim plate, 100-lb. box, Pittsburgh	9.00	9.00	9.37½	7.50
Tim plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.60	\$3.40

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive fire box steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
I-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to length, under 3 ft., to 2 ft. inclusive	.25
Cutting to length, under 2 ft. to 1 ft. inclusive	.50
Cutting to length, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.55; galvanized, \$1.95. Galvanized barb wire, to jobbers, \$2.15; painted, \$1.75. Wire nails to jobbers, \$1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.70	\$1.75	\$1.80	\$1.85	\$1.95	\$2.05	\$2.15	\$2.25
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from January 1, 1913; iron pipe (full weight), from October 21, 1912:

Steel.			Iron.		
Inches.	Black.	Galv.	Inches.	Black.	Galv.
¼, ½ and ¾	73	52½	½ and ¾	67	48
¾	77	66½	¾	66	47
¾ to 3	80	71½	¾ to 2½	70	57
				73	62
Lap Weld.					
2	77	68½	1½	57	46
2½ to 6	79	70½	1½	68	57
7 to 12	76	65½	2	69	59
13 to 15	53	..	2½ to 4	71	62
			4½ to 6	71	62
			7 to 12	69	56

Plugged and Reamed.					
1 to 3, butt	78	69½	1 to 1½, butt	71	60
2, lap	75	66½	2, butt	72	61
2½ to 4, lap	77	68½	1½, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

Butt Weld, extra strong, plain ends.					
¾, ½ and ¾	68	57½	¾	64	53
¾	73	66½	¾	68	61
¾ to 1½	77	70½	¾ to 1½	72	63
2 to 3	78	71½	2 and 2½	73	64

Lap Weld, extra strong, plain ends.					
2	74	65½	1½	66	60
2½ to 4	76	67½	2	67	59
4½ to 6	75	66½	2½ to 4	71	62
7 to 8	68	57½	4½ to 6	70	61
9 to 12	63	52½	7 and 8	64	54
			9 to 12	59	48

Butt Weld, double extra strong, plain ends.					
¾	63	56½	¾	58	50
¾ to 1½	66	59½	¾ to 1½	61	53
2 to 2½	68	61½	2 to 2½	63	55

Lap Weld, double extra strong, plain ends.					
2	64	57½	2	56	50
2½ to 4	66	59½	2½ to 4	61	55
4½ to 6	65	58½	4½ to 6	60	54
7 to 8	58	47½	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers in carloads on lap welded steel, in effect from February 1, 1913, and standard charcoal iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap Welded Steel.		Standard Charcoal Iron.	
1½ and 2 in.	60	1½ in.	44
2½ in.	57	1½ and 2 in.	48
2½ and 2¾ in.	63	2½ in.	44
3 and 3¼ in.	68	2½ and 2¾ in.	53
3½ to 4½ in.	70	3 and 3¼ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60	Locomotive and steamship-special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b., Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.		Cents per lb.
Nos. 3 to 8		1.70
Nos. 9 and 10		1.75
Nos. 11 and 12		1.80
Nos. 13 and 14		1.85
Nos. 15 and 16		1.95

Box Annealed Sheets, Cold Rolled.		Cents per lb.
Nos. 10 and 11		2.00
No. 12		2.00
Nos. 13 and 14		2.05
Nos. 15 and 16		2.10
Nos. 17 to 21		2.15
Nos. 22 and 24		2.20
Nos. 25 and 26		2.25
No. 27		2.30
No. 28		2.35
No. 29		2.40
No. 30		2.50

Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

Pittsburgh

PITTSBURGH, PA., February 10, 1913.

Four of the leading steel companies report that specifications against contracts in January were heavier than shipments, so that they have been getting still further behind in delivery. The new demand has fallen off considerably, but this is natural in view of the heavy buying in the last three or four months of 1912. The market on finished iron and steel is firm, but pig iron, coke and scrap are quiet and weak, especially coke and scrap. In the past three weeks furnace coke for prompt delivery has declined from \$1.50 to \$1.75 a ton. The market on scrap has gone off from \$1 to \$1.50 a ton, and this is having a sympathetic effect on pig iron, especially basic and foundry. Some inquiry is in the market for basic iron.

Pig Iron.—The Colonial Steel Company is in the market for about 6000 tons of basic iron, equal deliveries over four months commencing March. Competition to secure this business is keen and prices that so far have gone in on the inquiry range from \$16.35 to \$16.50 at Valley furnace. About two weeks ago a local steel company came in the market for 5000 to 6000 tons of basic, and while it was offered as low as \$16.35, Valley furnace, it did not buy but decided to wait, not being badly in need of the iron. The starting up of a blast furnace at Sharpsville, Pa., on foundry iron, and which had no orders booked, has brought about a weakness in prices of that grade. We quote Bessemer iron for first half delivery at \$17.25; basic, \$16.35 to \$16.50; malleable Bessemer, \$17 to \$17.25; No. 2 foundry, \$17 to \$17.25; gray forge, \$16.25 to \$16.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—It is pretty thoroughly understood that there is no surplus steel in the market; if there was it would be quickly taken up by consumers who are not getting deliveries fast enough from their regular sources of supply. A large consumer of sheet bars was inquiring last week for 1500 to 2000 tons for second quarter, but was unable to find a mill that could take the order. An attempt to have a mill reserve this tonnage for third quarter at to-day's prices was declined. A few dealers have some small lots secured in trades for pig iron, which they are offering on the basis of \$30 to \$31 for billets and \$31 and higher for sheet bars. In the absence of any recent sales we quote the market nominally as follows: Bessemer billets, \$28.50 to \$29; Bessemer sheet bars, \$29 to \$29.50; open-hearth billets, \$29 to \$29.50, and open-hearth sheet bars, \$29.50 to \$30, f.o.b. mill, Pittsburgh or Youngstown. Forging billets, \$36 to \$37 and axle billets \$34 to \$35, Pittsburgh.

Ferroalloys.—Some weakness developed early last week in ferromanganese for prompt delivery, one or two sales having been made at \$64, seaboard. The market has since firmed up and 80 per cent. is firmly held for prompt and forward delivery at \$65, seaboard, equal to \$66.95 delivered in the Pittsburgh district. Most consumers are covered through first half and in some cases for the entire year. Deliveries are better. We note sales of three or four cars, or about 100 tons, of 80 per cent. ferromanganese for prompt delivery at \$64.75, seaboard. Ferrosilicon is very strong, and numerous sales are being made of carload lots at the full price of \$75, Pittsburgh. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Wire Rods.—Sales of 500 to 600 tons of Bessemer or open-hearth rods, option of the mill, are reported at \$30, Pittsburgh. We quote Bessemer, open-hearth and chain rods at \$30, Pittsburgh.

Muck Bar.—The market is practically lifeless. We quote best grades of muck bar, made from all pig iron, at nominally \$31, Pittsburgh.

Skelp.—New inquiry is less but the market is firm. A local pipe mill bought 2000 to 2500 tons of grooved steel skelp in narrow sizes last week on the basis of about 1.45c., delivered. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

Structural Material.—Plans are now being made for the new department store of the Baer-Kaufmann Company in this city, and the steel, 8000 to 10,000 tons, will be placed in a short time. The Thompson-Starrett Company has agreed to erect this building complete in about five months, so that the seller of the steel will have to make very prompt deliveries. The McClintic-Marshall Construction Company has taken 800 tons for a bridge for the New York Central Railroad at Rochester, N. Y., and about 1400 tons for a new steel building for Larkin & Co. at Philadelphia. The question whether the Pittsburgh Subway Company will be granted a franchise will likely be decided this week. If it goes through this project will take 75,000 tons or more of structural steel and plates. New inquiry is reported very active, and the outlook is that there will be a large amount of building this year. Local fabricators are filled up for six to eight months or longer. Prices are firm, but the Carnegie Steel Company and the Jones & Laughlin Steel Company are taking orders for delivery over the remainder of the year at 1.45c. for beams and channels. We quote beams and channels up to 15-in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which means third or fourth quarter of this year, while small lots from warehouse or other sources for delivery in three to four weeks are bringing all the way from 1.75c. to 2c. or higher.

Plates.—The order of the Harriman lines for 12,600 cars has been placed, with the exception of 800 automobile cars, which have been reserved. It was divided among the Pullman Company, Pressed Steel Car Company, American Car & Foundry Company and Standard Steel Car Company. The Pennsylvania Railroad order for 12,300 cars has been divided among the Cambria Steel Company, Ralston Steel Car Company, American Car & Foundry Company, Standard Steel Car Company, Pressed Steel Car Company and Western Car & Foundry Company. The Newburg & South Shore Railroad has bought 125 ore cars from the Standard Steel Car Company, 50 general service cars from the Ralston Steel Car Company and 50 all-steel cars from the Standard Steel Car Company. The Eastern plate mills have been delivering a good deal of tonnage in plates in the Pittsburgh district, and premiums for prompt delivery have declined. For delivery within two or three weeks, 1.60c. to 1.65c. is readily paid for carload and larger lots, and on small lots from 1.70c. up to 1.90c. is being done. The new inquiry for plates for prompt shipment has quieted down to some extent. We quote ½-in. and heavier tank plates at 1.45c., Pittsburgh, for delivery at convenience of the mill, which would be late in this year, probably third quarter, while for delivery in three to four weeks 1.60c. to 1.65c. is quoted in carload and large lots, and for small lots from 1.75c. to 1.90c., f.o.b. Pittsburgh.

Steel Rails.—No important contracts for standard sections were placed in the past week. Specifications from the railroads for nearly all the rails to be delivered up to July are in the hands of the mills. The new demand for light rails is active, the Carnegie Steel Company receiving new orders and specifications in the past week for close to 5000 tons. We quote splice bars at 1.50c. per lb., and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Car Wheels.—The activity of the railroads in placing orders for steel cars is bringing out a very heavy demand for car wheels. The Carnegie Steel Company has received an order from the Wheeling & Lake Erie Railroad for 4000 steel car wheels and the Standard Steel Car Company, Butler, Pa., has taken an order from the Chesapeake & Ohio Railroad for 24,000. The Norfolk & Western is in the market for 25,000 to 26,000 wheels, and the Pennsylvania Railroad is expected to buy this week about 100,000, one-third of which will be chilled cast iron and the remainder steel. We quote 33-in. rolled steel wheels for freight service at \$15 to \$15.50 and 36-in. for passenger cars at \$19 to \$19.50 per wheel, f.o.b. Pittsburgh.

Iron and Steel Bars.—New buying in iron and steel bars has latterly not been heavy, due to the fact

that consumers have covered their needs up to July or longer. Specifications against contracts are pouring into the mill at a rapid rate. The Carnegie Steel Company and the Jones & Laughlin Steel Company are accepting contracts for steel bars for remainder of the year delivery at 1.40c. Pittsburgh, but on new orders deliveries are not promised before third quarter or later. The demand for iron bars is fairly large, and the mills are filled from three to four months ahead. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for fairly prompt shipments 1.60c. to 1.75c. is readily paid, and in some cases sales for prompt delivery have been made at 1.85c. and higher. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge \$1 extra per ton for twisting 1½-in. and larger steel bars, and \$2 extra for 1½ to 3½ in.

Sheets.—Most mills have their output sold to July, and it is hard to find one that will take new orders for shipment before May or June. Some consumers who thought late last year that they had fully covered their requirements for first half have recently come in the market again with inquiries for considerable tonnage for delivery in second quarter, and the mills that are able to take care of this business are getting the full new prices for it. In January specifications against contracts were heavier than shipments, and as yet the mills have been unable to catch up on back deliveries. On blue annealed most of the mills are back six to eight weeks, on Bessemer black from eight to ten weeks and fully as far on galvanized. Jobbers are trying hard to induce the mills to accept contracts at present prices for third quarter, but the latter are refusing to do this, in some cases having accepted contracts for third quarter shipment from manufacturing customers only. The shortage in supply of steel is not any better, and is interfering seriously with the output of sheets. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.50c. for No. 28 galvanized and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—There has been a decided increase in the last two or three weeks in specifications against contracts for tin plate, which are much heavier now than usual so early in the year. One of the reasons given for this is the fear of consumers that they will not be able to get deliveries promptly when they really need tin plate. Some consumers who placed heavy contracts late last year have placed additional orders with other mills. It is still believed that there will be a shortage in supply of tin plate this year. A good deal of new capacity is under way in tin plate but this will not come in the market until late summer. The mills are now running to an average of about 80 per cent. There is talk of an advance in prices in view of the high market on tin bars and pig tin, but nothing official has yet been given out. We quote 100 lb. cokes at \$3.50; 100 lb. ternes at \$3.45, and No. 28 gauge black plate at \$2.30 f.o.b. Pittsburgh.

Spelter.—Prices have further declined. We quote prime grades of Western at 6.50c., East St. Louis, equal to 6.62½c., Pittsburgh.

Railroad Spikes.—New buying is quiet, as most of the railroads have covered their requirements for some months ahead. All the spike makers are considerably behind in shipments. We quote railroad spikes in base sizes, 5½ x 9/16 in., at \$1.90, and small railroad and boat spikes at \$1.90 and \$2 per 100 lb., f.o.b. Pittsburgh, for forward delivery.

Hoops and Bands.—The makers of hoops and bands have their output sold up to July and have not yet opened their books on contracts for delivery in third quarter, although being importuned to do so by consumers. We quote steel bands at 1.40c. to 1.45c., with extras as per the steel bar card, and steel hoops at 1.60c. to 1.65c., f.o.b. Pittsburgh, these prices being on orders for shipment at convenience of the mills.

Shafting.—The consumption of shafting this year promises to be very heavy, especially by the automobile interests and implement makers and wagon builders. New demand is quiet. We quote cold-rolled shafting at 58 per cent. off in carloads and larger lots, and 52 per cent. in small lots delivered in base territory.

Merchant Steel.—Shipments by four of the leading mills so far this month are in excess of the same period in January. Leading makers have their output pretty well sold up to July or longer, but new orders are not large. We quote: Iron finished tire, 3½ x ¾ in. and larger, 1.40c. to 1.55c., base; under 1½ x ¾ in., 1.55c. to

1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, ¾ to 1, 1.90c. to 2c.; 1½ in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring-steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Wire Products.—The strike at the Rankin and Braddock plants of the American Steel & Wire Company is over. The new demand for wire nails continues active, but wire is quiet. Some time ago the Pittsburgh Steel Company advanced wire nails to \$1.80 per keg and wire of all kinds \$1 a ton, but this advance did not cut much figure in the market, the company stating that its product was sold up for several months ahead, and it has therefore taken little new business at the higher prices. We quote wire nails at \$1.75 per keg; cut nails, \$1.70 per keg; galvanized barb wire, \$2.15 per 100 lb.; painted, \$1.75; annealed fence wire, \$1.55, and galvanized fence wire, \$1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Bolts and Rivets.—The new demand so far this month has been as heavy as in the same period in January. Prices are firm but unchanged. We quote button head structural rivets at \$2.20 and cone head boiler rivets at \$2.30 per 100 lb. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	.....	.80 and 10% off
Small carriage bolts, cut threads	.....	.75 and 5% off
Small carriage bolts, rolled threads	.....	.75 and 10% off
Large carriage bolts	.....	.70% off
Small machine bolts, rolled threads	.....	.75, 10 and 5% off
Small machine bolts, cut threads	.....	.75 and 10% off
Large machine bolts	.....	.70 and 7% off
Machine bolts with C.P.C. and T nuts, small	.....	.75 and 5% off
Machine bolts with C.P.C. and T nuts, large	.....	.70% off
Square hot pressed nuts, blanked and tapped	.....	\$5.70 off list
Hexagon nuts	.....	\$6.30 off list
C.P.C. and R. square nuts, tapped and blank	.....	\$5.70 off list
Hexagon nuts ¾ and larger	.....	\$6.60 off list
Hexagon nuts smaller than ¾	.....	\$7.20 off list
C.P. plain square nuts	.....	\$5.20 off list
C.P. plain hexagon nuts	.....	\$5.50 off list
Semi-finished hexagon nuts, ¾ and larger	.....	.85% off
Semi-finished hex. nuts smaller than ¾	.....	.85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	.....	.75, 10 and 10% off
Rivets, metallic tinned, bulk	.....	3¼c. per lb. net extra
Rivets, tin plated, bulk	.....	1½c. per lb. net extra
Rivets, metallic tinned, packages	.....	.70, 10 and 10% off

Boiler Tubes.—The new demand continues heavy. A large number of locomotives have lately been placed and these will result in heavy orders for tubes. The new demand for seamless tubing is particularly active, and all makers are considerably behind in deliveries. The discounts on tubes are reported as being firmly held.

Iron and Steel Scrap.—The local market is stagnant, consumers being well stocked and refusing to buy. The local interest that has been a consistent buyer of scrap until recently has declined to buy heavy steel scrap at \$14, delivered. There are no embargoes on at present, but some of the leading consumers are suspending shipments and a good deal of scrap is pressing the market to find buyers. Dealers now quote, per gross ton, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	.....	\$14.25 to \$14.50
No. 1 foundry cast	.....	15.00 to 15.25
No. 2 foundry cast	.....	14.00 to 14.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	.....	12.60 to 12.25
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	.....	16.25 to 16.50
No. 1 railroad malleable stock	.....	14.25 to 14.50
Grate bars	.....	10.75 to 11.00
Low phosphorus melting stock	.....	18.00 to 18.25
Iron car axles	.....	24.25 to 24.75
Steel car axles	.....	17.75 to 18.00
Locomotive axles, steel	.....	21.75 to 22.00
Locomotive axles, iron	.....	27.75 to 28.00
No. 1 busheling scrap	.....	14.25 to 14.50
No. 2 busheling scrap	.....	10.25 to 10.50
Old carwheels	.....	15.75 to 16.00
*Cast-iron borings	.....	10.00 to 10.25
*Machine shop turnings	.....	9.50 to 9.75
†Steel bar crop ends	.....	16.50 to 16.75
Old iron rails	.....	36.25 to 36.50
No. 1 railroad wrought scrap	.....	16.00 to 16.25
Heavy steel axle turnings	.....	12.75 to 13.00
Stove plate	.....	10.75 to 11.00

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Merchant Pipe.—One of the Canadian natural gas companies has placed an order with a local mill for about 200 miles of line pipe, most of it ranging from 6 to 12 in., but a small part being for 2-in. for service lines. It is also reported, but not confirmed, that inquiries are in the market for 500 to 600 miles of 10 to 20-in. for delivery in Canada, but nothing definite will be given out now, as all the rights of way have not been secured. The new demand for merchant pipe continues heavy and all the mills are back in shipments from six to eight weeks or longer. Regular discounts on both iron and steel pipe are reported as being firmly held.

Coke.—The decline in prices of furnace coke for spot shipment is still going on. Last week several sales of furnace coke were made at \$2.60 to \$2.75 at oven. This week standard makes of furnace coke have been sold for prompt shipment at \$2.50 per net ton at oven, a drop of more than \$1.50 in about three weeks. The market seems to be glutted. The low prices have brought out some inquiry for furnace coke for prompt shipment. We quote standard grades of furnace coke for prompt shipment at \$2.50 and on contracts for delivery up to July it is probable that this price could be done. There is now a wide difference in prices of furnace and foundry coke for prompt delivery, a local concern reporting several sales of standard 72-hr. foundry coke at \$4 per net ton at oven, but this price is above the present market. We quote standard 72-hr. foundry coke for prompt delivery at \$3.50, and this price or lower would be done on contracts, but there is no inquiry. The Connellsville Courier reports that the Connellsville region made last week 422,753 net tons, an increase over the previous week of 6000 tons, and the heaviest output in any one week for some months.

Chicago

CHICAGO, ILL., February 11, 1913.—(By Telegraph.)

Rumors of possible labor disturbances in large steelworks, based on attempts at organization by union leaders, are at variance with actual conditions, which are reported as very harmonious following the advances in wages generally adopted. Specifications for and new sales of finished materials continue heavier than production, new business in track fastenings, steel bars and car shapes being especially prominent. Local mills are finding themselves under the necessity of extending their bookings of second half business, particularly for sheets. The Harriman order for cars was distributed among several builders but even with this precaution delivery can hardly be made within a year.

Pig Iron.—Buying is light. For such sales as have been made prices show considerable variance. The fact that local furnaces are disposed to move off grade or special analysis iron even at a sacrifice in prices gives to the market a more ragged appearance than is applicable to the regular grades. These grades are practically unobtainable from local furnaces for delivery in the first quarter. The principal Southern furnaces are similarly situated; for such iron as is available, as low as \$13.50 can still be done for first half delivery while other brands are being moved at \$14. Resale Southern iron for spot shipment continues to appear as rapidly as it can be absorbed and therefore brings little better than the minimum prices. Inquiry for iron for deliveries for which the furnaces are anxious to sell is small. The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4...	\$18.00 to \$18.75
Northern coke foundry, No. 1.....	17.75 to 18.25
Northern coke foundry, No. 2.....	17.25 to 17.75
Northern coke foundry, No. 3.....	16.75 to 17.25
Southern coke, No. 1 foundry and No. 1 soft	18.35 to 18.85
Southern coke, No. 2 foundry and No. 2 soft	17.85 to 18.35
Southern coke, No. 3.....	17.35 to 17.85
Southern coke, No. 4.....	16.85 to 17.35
Southern gray forge.....	16.85 to 17.35
Southern mottled.....	16.35
Malleable Bessemer.....	17.25 to 17.75
Standard Bessemer.....	19.40 to 19.90
Basic.....	17.25 to 17.75
Jackson Co. and Kentucky silvery, 6 per cent.....	20.40
Jackson Co. and Kentucky silvery, 8 per cent.....	21.40
Jackson Co. and Kentucky silvery, 10 per cent.....	22.40

Rails and Track Supplies.—Specifications for both rails and track fastenings are important items in current steel business. Track bolt prices are firmer than at any time previously. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square

nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$32 to \$34.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The general building situation is quiet, but small buildings and enlargements are keeping the shops of local fabricators comfortably filled. Among the contracts placed the past week were 268 tons for the John R. Thompson theater building, Chicago, awarded to A. Bolter's Sons; 179 tons for the Santa Fe Railroad at Argentine, Kan., to the Missouri Valley Bridge & Iron Company; 330 tons for the Chicago, Milwaukee & St. Paul, to the King Bridge Company, and 450 tons for the Milwaukee Western Fuel Company, to the American Bridge Company. We quote for Chicago delivery, plain shapes, 1.63c.

Store business continues to show an unprecedented volume.

(By Mail)

Plates.—The large mills are heavily sold up. Sales have been reported by others in a position to make deliveries in four to six weeks at 1.93c., Chicago, though 1.63c. can be done when buyers are willing to wait from six to eight months. Current demand continues in large volume. We quote for Chicago delivery from mill, 1.63c.

The demand upon jobbers for plates continues in generous proportions. We quote for plates out of store, 2.05c.

Sheets.—Local manufacturers declare that they can very easily fill their books with second-half business if they should desire to take orders for so far ahead. In some cases they have been obliged to do so. On new business placed now it is very difficult to obtain shipment until after the first half of the year. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.93c.

Out of store prices continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Bars.—Some transactions in bar iron at 1.57½c. are reported, though 1.60c. is more nearly the average at which current business is being accepted. Deliveries of bar iron can be made with fair promptness, but the steel bar situation is not so favorable with regard to shipments. Though the aggregate volume is good for this season in bar iron, the orders individually are small, mostly in 200 or 300 ton lots at the greatest. Reinforcing bars for concrete construction are in good demand. We quote for mill shipment as follows: Bar iron, 1.60c. to 1.65c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

Rivets and Bolts.—Business in bolts continues in good volume. In some cases orders are not easily taken care of, owing to the already crowded condition of the mills. The rivet situation is a little easier. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ¾ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; larger sizes, 70-7½; coach screws, 80-10; hot pressed nuts, square head, \$5.70 off per cwt.; hexagon, \$6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

Wire Products.—Shipments of wire products are large. Jobbers and retailers are specifying liberally in preparation for spring requirements. Manufacturing demand for woven wire fabrication continues strong. Prices are very firm. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.73; wire nails, \$1.93; painted barb wire, \$1.93; galvanized, \$2.33; polished staples, \$1.93; galvanized, \$2.33, all Chicago.

Cast Iron Pipe.—Routine business is good, as gas companies and municipalities are anticipating their needs for spring repairs and minor extensions. Bids have been returned from San Diego, Cal., owing to the fact that that city has not yet disposed of a bond issue for waterworks improvements. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$31; 6 to 12 in., \$29; 16 in. and up, \$28, with \$1 extra for gas pipe.

Old Material.—Approximately 20,000 tons of scrap has been offered in the local market by railroad lines.

The lists will be closed this week, and have had a tendency toward further weakening of the local market, which is already over-supplied. Among the lists was one sent out by the Atchison, Topeka & Santa Fe aggregating 11,000 tons, which includes 1000 tons of No. 1 railroad wrought, 750 tons of No. 2 railroad wrought, and 900 tons of No. 1 cast. For a considerable period that railroad had been following a policy of accumulating scrap, and though its lists have appeared at regular intervals, no large sales have been made. Lately it has been inclined to move some of its accumulations. The current offering of 11,000 tons is the largest quantity it has placed on the market at any recent date. The Chicago, Milwaukee and St. Paul is out with a list of about 2000 tons; the Michigan Central has offered 1500 tons; the Wabash, 800 tons; the Minneapolis, St. Paul & Sault Ste. Marie, 3000 tons; the Chicago & Alton, 200 tons, and the Lake Shore has a list out in which the quantity is not stated. The Missouri & Pacific also has a list out on scrap in St. Louis yards. The situation in the local market is one of very little activity. During the past week some demand for shoveling steel came from Gary, Ind., but other items found few buyers and none whose needs were large. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	\$16.25 to \$16.75
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	16.75 to 17.25
Heavy melting steel scrap	12.25 to 12.75
Frogs, switches and guards, cut apart	12.25 to 12.75
Shoveling steel	12.25 to 12.75
Steel axle turnings	10.50 to 11.00

Per Net Ton.

Iron angles and splice bars	\$15.50 to \$16.00
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	12.00 to 12.50
Iron car axles	21.00 to 21.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
Cut forge	11.90 to 12.00
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.75 to 13.25
Locomotive tires, smooth	13.75 to 14.00
Machine shop turnings	7.50 to 8.00
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler machines	12.50 to 13.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.75 to 12.25
Pipes and flues	9.25 to 9.50

Philadelphia

PHILADELPHIA, PA., February 10, 1913.

The pig iron market still drags, both buyers and sellers awaiting developments. Eastern iron and steel mills continue to receive good orders as well as inquiries, particularly for car and boat material. Further inquiries for billets for export to England have come out. Order books have been opened in a limited way for third quarter sheets. Iron bars are less active, although a good demand continues for steel bars. The iron ore market is practically at a standstill. Little business is moving in old material and prices of leading grades are lower. Prompt furnace coke has been sold to Eastern consumers at \$2.30 at oven.

Pig Iron.—Business continues along narrow lines. Consumers defer purchases, while sellers are not disposed to force things. A number of large buyers in this district intimate that it will be the middle of March before they expect to come into the market for second quarter needs. In the meantime producers are receiving urgent requests for deliveries and numerous consumers are asking that their March allotments on contracts be anticipated. Statistics of the Eastern Pig Iron Association show a decline in unfilled orders, although sufficient business is on hand to take productive capacity for some time. Stocks on furnace yards are lower than ever, and on many grades producers find it difficult to keep up with deliveries. Productive capacity will be further curtailed this week by the blowing out for repairs of one of the stacks of the Warwick Iron & Steel Company. Pig iron purchases continue light. In foundry grades the bulk of the movement has been in odd lots for early delivery on which there is little competition; sellers are generally realizing full prices,

with standard brands of eastern Pennsylvania No. 2 X foundry at \$18.50, delivered. Less well known brands sell at \$18.25, and on competitive business this price would no doubt also apply to some standard brands. Quotations depend largely on the customer, quantity and condition of sellers' order books. Virginia foundry grades are dull. While prompt No. 2 X for shipment is scarce and brings \$16, furnace, lower grades are available on the basis of \$15.50. For first half delivery \$15.50, furnace, rules for No. 2 X. Cast iron pipe makers are taking odd lots of off grade iron, but have no definite inquiries out. A malleable iron maker is asking for quotations on 1000 tons of coke malleable. Forge iron is quiet, although there is some large business in sight. Very little is doing in steel making iron. Basic is uncalled for, consumers not yet being ready to enter the market for second quarter. Small sales of standard low phosphorus pig have been made at \$24.50, delivered, while Lebanon low phosphorus has been sold at \$21, furnace. These grades are scarce and it is understood that a recent inquiry for 1000 tons of standard analysis iron is still unclosed. Quotations are inclined toward irregularity, with quotations for delivery in buyers' yards in this district ranging about as follows:

Eastern Pennsylvania No. 2 X foundry	\$18.25 to \$18.50
Eastern Pennsylvania No. 2 plain	18.00 to 18.25
Virginia No. 2 X foundry (first quarter)	18.80 to 19.00
Virginia No. 2 X foundry (second quarter)	18.30 to 18.50
Virginia No. 2 plain (first quarter)	18.55 to 18.75
Virginia No. 2 plain (second quarter)	18.05 to 18.25
Gray forge	17.50
Basic	18.00 to 18.25
Standard low phosphorus	24.50

Ferroalloys.—Several carload sales of 80 per cent. ferromanganese at \$65, seaboard, have constituted the only business reported. Prices are unchanged at \$65, seaboard, for either prompt or second half delivery. Very little demand for either 50 per cent. or furnace ferrosilicon has developed, and prices are unchanged.

Billets.—A steady demand in moderate lots continues in both rolling and forging billets. Mills are not seeking business for extended delivery, although consumers would place contracts. An inquiry for 6000 tons of rolling billets, delivery over 12 months, for export to England, has been received by Eastern mills, but some producers have refused to quote. Specifications are heavy and mills are operating at top capacity, but are still unable to fill the demand, particularly for early delivery. Current business for extended shipment is moving at \$32, delivered here, for basic open hearth rolling billets, while forging steel is quoted at \$36, minimum, Eastern mill.

Plates.—A very satisfactory volume of business has been coming to Eastern mills. Specifications have been heavier as well as more numerous, and mills are unable to gain on deliveries. Railroad business continues the feature, although interesting inquiries for boat plates are before the trade. One inquiry for 10,000 tons of plates for bridge work has come out. Prospective buying in ship plates aggregates approximately 25,000 tons. Plate makers are decidedly optimistic as to the future and are maintaining prices firmly and, as a rule, are unwilling to enter business for second half or third quarter shipment. While Western plates can be had at 1.65c., delivered here, subject to uncertain extended delivery, Eastern mills enter business freely for first half shipment at 1.75c. for sheared and 1.80c. for universal plates delivered in this district.

Structural Material.—The most important new project in this district is the Finance Company's building on South Penn square, which will require about 2000 tons. Several smaller building propositions are in sight. Plain material makers experience no falling off in the demand; mills are operating full capacity. Bridge work is an important factor and promises to increase materially. Considerable business in boat shapes is being estimated on. Mills still find it hard to meet demands for deliveries and prompt shipments are more difficult to be had. Prices are strong, Eastern mills quoting 1.75c., delivered, for plain shapes, for first half shipment, while prompt shapes, when available, bring from 1.85c. to 2c., delivered.

Sheets.—Eastern mills have entered some business from regular customers for third quarter shipment at current quotations, but are not opening books generally for delivery so far ahead. Urgent requests for hurried shipments are being received, but, outside of business already entered, prompt sheets are scarce. Mill operations continue at maximum rate. Prices are firm. Western No. 10 blue annealed sheets are quoted at 1.00c., while Eastern mills, making smooth, loose-rolled sheets, readily obtain 2.05c. for the same class of material.

Bars.—A fair volume of business is moving in iron bars, although mills are beginning to catch up on deliveries and premiums for prompt shipments are less in evidence. There is a better supply of some grades and consumers are not confronted with any immediate scarcity and therefore show less urgency to place orders. Prices are well maintained at 1.67½c. to 1.77½c., delivered here, according to grade and delivery date. There is a good demand for steel bars, which are quotably unchanged at 1.55c. to 1.60c., here, for extended, and 1.85c. for prompt delivery.

Coke.—With prices sagging, buyers withhold business whenever possible, waiting for the market to reach a firm level. Furnace coke is particularly weak and indications point to lower prices. Prompt furnace coke is quoted from \$2.75 at oven down, according to grade, and some buyers now look for \$2 coke. Foundry coke is inactive, with prices weaker in sympathy with furnace coke; \$3.75 to \$4. at oven, has been more freely done for some grades. The following range of prices per net ton about represents the market for deliveries in this district.

Connellsville furnace coke.....	\$4.70 to \$5.20
Connellsville foundry coke	5.75 to 6.25
Mountain furnace coke.....	4.35 to 4.85
Mountain foundry coke	5.40 to 5.90

Old Material.—Business has been very light and confined largely to forced sales. Heavy melting steel on recent railroad lists was taken in instances at close to \$13.50. Consumers of heavy melting steel show no interest in the market; one buyer has named \$12.50, delivered, considering this a prohibitory price. Rolling mills are well stocked and show little interest, even in bargain lots. In the majority of grades of old material not enough business is moving to establish a market. Quotations are largely nominal, the following range about representing the market for small lots, delivered in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel.....	\$13.00 to \$13.50
Old steel rails, rerolling (nominal).....	16.00 to 16.50
Low phosphorus heavy melting steel scrap.....	18.00 to 18.50
Old steel axles (nominal)	19.00 to 20.00
Old iron axles (nominal)	27.00 to 28.00
Old iron rails	18.00 to 18.50
Old car wheels	15.50 to 16.00
No. 1 railroad wrought (nominal).....	15.00 to 15.50
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	10.00 to 10.50
Wrought turnings	10.50 to 11.00
Cast borings	10.50 to 11.00
Machinery cast	14.50 to 15.00
Gate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	13.50 to 14.00

Cleveland

CLEVELAND, OHIO, February 10, 1913.

Iron Ore.—Owing to the heavy dock shipments this winter there was less ore on Lake Erie docks February 1 than at the same day a year ago, although the tonnage on docks December 1 last broke all records. On December 1 there was 9,497,168 tons of ore on Lake Erie docks. Since then the docks have sent forward to the furnaces 1,137,052 tons. Dock shipments during January reached 842,952 tons. The weather has been favorable for handling ore during the greater part of the winter and the heavy consumption indicates that dock stocks will be lower at the opening of navigation than for several years. No sales or inquiries are reported. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60, and Mesaba non-Bessemer, \$3.40.

Pig Iron.—A reduction of 50c. a ton on foundry iron has been made by a Cleveland interest. This lower quotation was not unexpected considering the weakness in the Valley which has resulted in the quotation of \$17 for No. 2 foundry becoming quite general. For the first half delivery \$17 at furnace is now being quoted by this local interest. Another Cleveland seller is adhering to the \$17.50 price in the Cleveland territory. However, it is understood that the \$17 price has been shaded 50c. a ton to meet Valley competition for shipment in the Pittsburgh district, the freight rate from Cleveland being 50c. higher than the Valley. The lower quotations appear to be only for delivery up to July 1. The market is very dull, no sales being reported except a few small lots for early or first half delivery. There is practically no inquiry for last half contracts. In spite of the dullness, the demand for iron on contract shows no falling off and the melt continues very heavy,

Southern grades are also dull. Tennessee furnaces continue to offer No. 2 foundry at \$13.50 Birmingham for delivery through the remainder of the year. Several Alabama furnaces are quoting No. 2 at \$14, but this could probably be shaded for early delivery. For prompt shipment and for the first half we quote, delivered Cleveland, as follows:

Bessemer	\$17.90 to \$18.15
Basic	17.25 to 17.40
Northern No. 2 foundry.....	17.25 to 17.75
Southern No. 2 foundry	17.85 to 18.35
Gray forge	17.00 to 17.25
Jackson County silvery, 8 per cent. silicon, 20.55 to 21.55	

Coke.—The market is weak and quiet. Prices on both furnace and foundry grades have further declined. Standard furnace coke is quoted at \$2.75 per net ton at oven for contract and \$3 for spot shipment; the latter price, however, could probably be shaded 10 or 15 cents a ton. Standard 72-hr foundry coke is generally quoted at \$3.50 for contract and \$3.75 for spot shipment.

Finished Iron and Steel.—New demand is holding up well. A fair volume of orders is being taken for small lots of material for early delivery at the premium prices that have prevailed recently. None of the mills reports an improvement in deliveries. On the other hand the leading interest states that its deliveries are worse and consumers are crowding harder for shipments than at any time in the past few months. The demand for bar products is very heavy. There is considerable inquiry for round lots for delivery within the next three or six months. Buyers in some cases unable to secure definite promises of delivery are placing orders subject to delivery at the convenience of the mills. The demand for small lots of structural material is unusually heavy for this period. Owing to the scarcity of material available for early delivery much of this business is going to warehouses, and jobbers are unable to keep their stocks anywhere near complete. No new building work has come out, but a large amount is in prospect. A Cleveland concern was one of four bidders for two government pontoons and cranes for Panama, the other bids coming from England and Germany. The cranes and substructures will require 2500 tons or more of steel. Preliminary inquiries are out for steel for the new plant of the Otis Steel Company, which will take a large tonnage. Bar iron is in fair demand, with the price unchanged at 1.65c. Cleveland. A revision of Cleveland-warehouse prices has been under consideration, but it has been decided to make no change in these prices. Warehouse prices are 2.10c. for steel bars and 2.25c. for plates and structural material.

Old Material.—The market is very dull and prices show a further downward tendency, although quotations generally are unchanged. Mills are buying in very small lots, few sales being reported for more than car lots. Dealers are waiting for the market to improve and are not trying to force sales of round lots. The available supply is large. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$15.00 to \$15.50
Old iron rails	17.00 to 17.50
Steel car axles	18.75 to 19.25
Heavy melting steel	13.00 to 13.25
Old car wheels	15.00 to 15.50
Relaying rails, 50 lb. and over.....	23.00 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	12.50 to 13.00

Per Net Ton.	
Iron car axles	\$22.00 to \$22.50
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings.....	7.00 to 7.50
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.75 to 12.25
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., February 10, 1913.

Pig Iron.—January was a month of maximum production and small sales. Reports of stocks on hand are not available, but it is thought they will show an increase. The Oxmoor stack of the Tennessee Company has been drying out and is ready for charging. It will go in on foundry iron, the company already having seven furnaces on basic. The Woodward Company's enlarged and rebuilt stack will be ready for operations by April 1. There is no change in the attitude of buyers and sellers in this market. One furnace interest is still offering iron at \$13.50, with small sales. A broker sold 600 tons of this iron for February delivery at that figure. Small lots are moving at \$13.50 to

\$14. The large operators continue to hold to the \$14 minimum with as much tenacity as ever, and are the more inclined to do so as concessions do not seem to induce business. One of them sold only 2000 tons in January and, but for an export order, the sales of another would have been comparatively paltry. Some recent sales comprised a lot of 300 tons and one of 100 tons of analysis iron at \$15; one of 100 tons of Nos. 1 and 2 soft at \$15 for the No. 2, and \$15.50 for the No. 1. There seems no imminency of altered attitude on the part of the furnacemen, who are apparently relying on the first big buying movement before changing the price status one way or the other. Quotations are continued as follows:

No. 1 soft and foundry.....	\$14.00 to \$14.50
No. 2 soft and foundry.....	13.50 to 14.00
No. 3 foundry	13.25 to 13.75
No. 4 foundry	13.00 to 13.50
Gray forge	12.75 to 13.25
Basic	13.50 to 14.00
Charcoal	25.00 to 25.50

Cast Iron Pipe.—Outside of an order for 3000 to 4000 tons of water pipe for Seattle, price not stated, there has been a continuation of the quiet period with the pipe shops. Small orders are respectable in volume, but there are not sufficient on hand to keep the foundries busy. The pipe makers are keeping an eye on the price of iron. Quotations are as follows, per net ton: 4-in., \$24.50; 6-in. and over, \$22.50, with \$1 added for gas pipe.

Coal and Coke.—The State mine inspector makes the remarkable statement that every coal mine in Alabama is working on full time, a phenomenal condition, but one that is apt to be maintained because of maximum coke production and heavy shipments to the bunker and domestic trades at Mobile, Pensacola and New Orleans, as well as in the usual Southwestern territory. Prices are satisfactory and movements unhampered. Coke is in strong demand and superior grades are commanding \$3.75 to \$4 per net ton.

Old Material.—Dealers are fighting shy of accumulations and devoting themselves to supplying actual demands. Relaying rails, machinery, cast and steel melting scrap command most attention. Relaying rails have been the one strong feature for some time, owing to an immense amount of engagements by contractors. Prices continue firm, as follows, per gross ton, f.o.b. yards:

Old iron axles	\$15.50 to \$16.00
Old steel axles	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 heavy melting steel	11.50 to 12.00
Tram car wheels	12.00 to 12.50
Standard car wheels	12.50 to 13.00
Light cast and stove plate	9.50 to 10.00

St. Louis

St. Louis, Mo., February 10, 1912.

Pig Iron.—Business has been chiefly of the fill in character, together with some small orders of a special nature, but in no case involving large amounts. The demand on contract iron, however, keeps up. In fact most purchasers are asking for deliveries in excess of their estimated requirements. Quotations here are on a basis of \$13.50 for No. 2 Southern foundry at Birmingham; \$17.50 for Ohio No. 2 foundry, Ironton basis, and \$17.50 for Chicago No. 2 X, at furnace.

Coke.—The market continues to soften, but the recession in prices has not as yet brought out any large new contracts. Energy seems to be bent chiefly toward getting shipments forward on existing contracts, and representatives of the ovens are of the opinion that consumers are inclined to wait in the belief that they will be able to get even better prices before long. In by-product the quotations remain on the Connellsville basis.

Finished Iron and Steel.—The steady run of orders is reported as keeping up, but no large items came out during the week, nor are any looked for until the nearer approach of the breaking of winter weather. The efforts of fabricators are being bent toward getting supplies ahead against the opening of spring work, but without particularly noticeable success, deliveries being still very much spread. A number of electric interurbans are figuring on placing rail orders shortly in order to have work begin when financing is finally closed. Track fastenings are in fair request for the season. The agricultural and wagon lines continue to urge forward shipments on contracts and they are also securing

themselves against the future by placing orders for future delivery in keeping with present demand. Bars are being taken about as fast as they can be supplied. Plates are so far out of delivery reach that little business is being done on them here. The American Refrigerator Transit Company is reported as having placed an order with the American Car & Foundry Company for 2000 cars for delivery in time to take care of the crops of the coming season. Supplies generally are still going forward too slowly to suit consumers, none of whom are holding back on their allotments. Considerable general demand for material is developing as a result of exceptional activity in the Oklahoma oil fields.

Old Material.—The overloading of millyards which seems to be prevalent in other districts is not apparent here, though the demand for scrap has not become any more active than was reported last week. The mills are well filled with orders, and purchases, according to the best information, will have to be made shortly in order to keep up supplies. The weather, too, is stiffening in its effect, as the railroads are not able to pick up their old material as rapidly as when it is warmer. Prices do not show any material change for the week. Lists out include one of 500 tons from the Mobile & Ohio, one of 600 tons from the Kansas City Southern and a small one of 100 tons from the Southern Railway in Mississippi. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$14.00 to \$14.50
Old steel rails, re-rolling	15.50 to 16.00
Old steel rails, less than 3 ft.	13.50 to 14.00
Relaying rails, standard section, subject to inspection	23.50 to 24.00
Old carwheels	15.50 to 16.00
Heavy melting steel scrap	13.25 to 13.75
Frogs, switches and guards cut apart	13.25 to 13.75

Per Net Ton.	
Iron fish plates	\$12.50 to \$13.00
Iron car axles	22.00 to 22.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	12.00 to 12.50
Railway springs	11.00 to 11.50
Locomotive tires, smooth	12.50 to 13.00
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 1 boilers, cut to sheets and rings	7.00 to 7.50
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.00 to 10.50
Pipes and flues	7.50 to 8.00
Railroad sheet and tank scrap	7.25 to 7.75
Railroad grate bars	9.50 to 10.00
Machine shop turnings	8.75 to 9.25
Bundled sheet scrap	7.50 to 8.00

Light Buying in British Markets

MIDDLESBROUGH, ENGLAND, January 31, 1913.

Since last writing the Cleveland warrant iron market has been badly shaken by the semi-panicky conditions at times ruling in copper, and by the renewal of unrest regarding the issue of the Balkan peace negotiations. Add to these influences the poor advices as to pig iron received by cable from the United States, and sufficient cause will be found for the dejected appearance of the market. We seem to have got to the point that no matter how excellent the technical speculative position is, the course of prices depends upon other and more substantial influences. Technically, no doubt copper was sound enough before the slump, because the holders were big people and the speculative market was full of bears, but this proved of no avail when first hands had to reduce their rates in the attempt to clear holdings. At present there is not the slightest wish on the part of consumers to buy ahead of needs, and it is to be feared that this attitude will be persisted in until the political horizon is very much clearer than is the case at present. Some of the leading Glasgow firms of dealers who are heavily committed to the rise in Cleveland iron speak with unshaken confidence as to the near future of trade, but it is not forgotten that some of their number were horribly bearish when the price was more than 105s. a ton less than today's and that they came in on the long side at a high price. Their lack of perception should be borne in mind in considering present utterances. It is true that makers of pig iron in the Midlands and Lancashire and Scotland are firm, but there is no mistaking the lessened volume of new buying.

While the German sellers of semi-finished steel are remarkably firm in their ideas as to prices and are fully sold up for the greater part of the first half, there is a steadily developing weakening in the Welsh bar

situation, and the time is not far ahead when there will be Welsh steel pressed for sale. A little time ago the price was £6 and over, whereas the man who bid £5 15s. today would be almost certain to be shot with a contract. The tin plate people are in a mess through the large additions made to productive capacity during the last two years or so, and it is interesting to notice that the agitation for a concerted shutdown emanates from the makers whose extensions have done more than anything else to create the present parlous state of affairs. There will no doubt be a shutdown, for mills cannot keep on indefinitely working for stock as they are now doing.

There is a lot of grumbling about the quality of some of the tin plates recently turned out by Welsh mills. It appears that the local steel makers, not able to procure adequate supplies of hematite, have been making inordinate use of scrap, and not the most suitable grade of this, with the result that buyers have lately rejected a number of lots and there is quite a hubbub about it.

Finished steel shows hardly any alteration, but there is no life about business.

The Libau Iron Works of Russia have fixed up an arrangement with Les Forges et Chantiers de la Méditerranée of France whereby they will be able to roll armor plate for the Russian Navy.

Boston

BOSTON, MASS., February 11, 1913.

Old Material.—The market is unsettled, with a slight weakening in prices, but as transactions are few the effect is wholly sentimental. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$11.00 to \$11.25
Low phosphorus steel	13.50 to 14.50
Old steel axles	14.50 to 15.00
Old iron axles	22.50 to 23.00
Mixed shafting	13.50 to 13.75
No. 1 wrought and soft steel	11.25 to 11.50
Skeleton (bundled)	9.50 to 9.75
Wrought iron pipe	10.00 to 10.25
Cotton ties (bundled)	9.50 to 9.75
No. 2 light	4.00 to 4.50
Wrought turnings	7.50 to 7.75
Cast borings	7.50 to 7.75
Machinery, cast	13.50 to 14.00
Malleable	10.50 to 11.00
Stoveplate	8.50 to 9.00
Grate bars	7.50 to 7.75
Cast-iron car wheels	13.50 to 14.00

Buffalo

BUFFALO, N. Y., February 10, 1913.

Pig Iron.—Placement for the week has been about 45,000 tons of all grades. Notwithstanding this heavy total, the rank and file of buyers are postponing purchases in the expectation apparently of obtaining more favorable prices a little later. This waiting attitude is maintained even by users who are not entirely covered for their full requirements for the second quarter. The price situation is still somewhat irregular. Some producers are inclined to hold more rigidly for maximum prices than others. Taken as a whole the market has shown a slightly lower trend and the price schedule for the Buffalo district should be revised to approximately the range given below. We quote f.o.b. Buffalo:

No. 1 foundry	\$17.00 to \$17.75
No. 2 X foundry	17.00 to 17.50
No. 2 plain	16.75 to 17.25
No. 3 foundry	16.50 to 17.00
Gray forge	16.25 to 16.75
Malleable	17.25 to 17.75
Basic	18.00 to 18.25
Charcoal, regular brand and analysis	18.00 to 19.00
Charcoal, special brand and analysis	21.75

Finished Iron and Steel.—Specifications on contracts show considerable increase and the pressure upon mills for shipment is unusually sharp; but there has been very little new buying. Such new business as is placed is by users who wish to safeguard themselves as to source of supply for some of their far forward requirements. In jobbing lines the month of January has been one of the largest on record in bars, plates and shapes, and the indications are that the heavy demand will continue during the present month at least. The

demand for wrought-steel pipe is good and prices are very firm. The call for iron bars is also good with prices remaining firm at 1.65c. for carloads and 1.70c. for less, Pittsburgh base; deliveries from mills being made in from 6 to 8 weeks. In fabricated structural there is increasing activity in new building propositions, the difficulty of obtaining definite date shipment promises being the principal restraining factor. Bids are to go in this week for 175 tons of steel for St. Mary's Academy at Dunkirk, N. Y. Plans are being completed for the South Side high school, Buffalo, calling for about 1000 tons. Bids are also soon to be taken for the Michaels Theatre, Allen street, Buffalo. The Oswego Bridge Company has the steel contract for the addition to the Hotel Victoria, Binghamton.

Old Material.—Demand for old carwheels and for cast borings continues good, but new buying in other lines of scrap materials shows no improvement. Prices for heavy melting steel and for busheling scrap are slightly weaker in consequence. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel	\$14.00 to \$14.50
Boiler plate, sheared	15.50 to 16.00
No. 1 busheling scrap	12.00 to 12.50
No. 2 busheling scrap	10.00 to 10.50
Low phosphorus steel	17.00 to 17.50
Old iron rails	15.00 to 15.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	17.00 to 17.50
Old iron axles	24.00 to 24.50
Old carwheels	15.75 to 16.25
Railroad malleable	13.25 to 13.75
Locomotive grate bars	11.00 to 11.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	10.00 to 10.50
Wrought-iron and soft steel turnings	8.25 to 8.50
Lean cast borings	8.75 to 9.00
Bundled tin scrap	18.00

The German Iron Market

Bars and Pig Iron Continue Strong—
Belgium Reports Lower Export Prices

BERLIN, January 30, 1913.—The report became current a few days ago, causing some sensation, that a public bidding for steel bars had called out a price of only 115.50 marks from an important manufacturer. This turned out, however, to be incorrect, the actual tender having been made at 125.50 marks. It now transpires that at a recent meeting of makers of bars a general interchange of views on the business situation was held, with the result of showing that all the mills are sold out for the half-year, and that they are so heavily employed that none of them is under the necessity of rolling bars to be held in stock to meet the spring demand. Large mills that usually have about 10,000 tons in stock at this season have now not above 2000 tons. The hesitating attitude of dealers for some weeks has as yet caused no visible change in the position of the mills, inasmuch as actual consumers continue to come forward with orders. The foreign demand for bars is also described as extraordinarily strong and export prices f.o.b. Antwerp, have risen to 122 marks. Big export dealers, however, are still showing considerable reserve in placing orders for long periods, in consequence of the continued uncertainty in the political outlook. In view of all the circumstances it is not believed among the mills that bar prices will recede for a considerable period, as new demands are steadily coming in sight. It is reported that another attempt will be made in about a month to effect an agreement among the bar mills as to prices and other matters; but this has been denied in an apparently authoritative way. At any rate, the outlook for such an arrangement being perfected may be pronounced as very unpromising.

The regular monthly meeting of the Pig Iron Syndicate last week called out an official summary of the situation, according to which the lively home and foreign demand for all grades continues with undiminished force. Although the demands for the current half-year were described at the end of December as already provided for, supplementary orders continue to come in; and it is difficult to place such extra orders, as most furnaces are sold to their capacity. Inquiries for large quantities from abroad have had to be declined. Calls for delivery are very urgent. The shipments for the entire year were 95.5 per cent. of the allotments. Since the above report was given out by the Syndicate it has entirely suspended the sale of iron for the rest of the half-year, and it leaves open the question whether it will take small supplementary orders at all. Also the price question is left open on such orders, which evi-

dently means that higher prices will probably be demanded.

The Belgian trade has this week sent in news of lower export prices on bars and plates, being the first reduction for some months. Basic steel bars dropped 2 shillings, iron bars 3 shillings, and heavy plates 1 shilling. Correspondents' reports mention the fact that consumers have grown rather undecided in their attitude; that negotiations are in progress in large volume, but that few transactions result.

New York

NEW YORK, February 11, 1913.

Pig Iron.—There is no more indication of buying than could be found one week ago. Inquiries reported in the immediate vicinity of New York amount to 2000 to 2500 tons, including one of 500 tons in Brooklyn, and another of the same amount in Newark, while a nearby pump works has asked for 400 tons. There is no apparent change in the rate of consumption by foundries, as practically all are calling for full contract shipments. It is conceded that if any considerable inquiry came up, it would be found that a number of furnaces would bid below the prices that were maintained in December and early January. Those furnace companies which have well filled order books are not attempting to force business, but it is recognized that the market is weaker than at the beginning of the year. The decline in coke encourages the expectation that contract prices will yet be made considerably below what was paid in November and early December, when a good deal of coke was bought for the first half of 1913. Recent quotations on Virginia iron indicate that the \$15.50 basis for No. 2 X is now made by a number of producers for first quarter, this being the price asked by the leading producer for some time on second quarter shipments, while it maintained \$16 at furnace for first quarter iron. We quote as follows for Northern iron at tidewater; No. 1 foundry, \$18.50 to \$19; No. 2 X, \$18 to \$18.50; No. 2 plain, \$17.75 to \$18. Southern iron is quoted at \$18.50 to \$18.75 for No. 1 foundry and \$18 to \$18.25 for No. 2.

Structural Material.—Another contract for the interborough transportation systems, New York, was let since last week's report, involving 24,000 tons structural steel work which is to be supplied by the American Bridge Company. The section is located in Queens and the steel work is elevated railroad structure, largely of plate girder construction. This and the contract mentioned last week are part of the rapid transit lines which the city is financing and the next section to come is expected to be in Broadway, requiring 12,000 to 14,000 tons of steel. By considerable the steel work involved in the proposition of the two large transportation companies is greater than that being paid for by the city, but this additional construction, including third tracking of existing elevated railroads, is held up pending the settlement of operating contracts. Another large contract placed with the American Bridge Company is for fabricating 5400 tons for the National Biscuit Company. In this case the plain material had already been bought and a contract for erection is yet to be placed. Aside from these two cases, closure of large structural projects has not been conspicuous, but the run of the relative small jobs has kept at the recent satisfactory rate and little improvement is noted in the time required for deliveries. The 20-story Earle mercantile building, Philadelphia, is now active and a 900-ton structure for the McMorro building on Thirty-sixth street, New York, is being figured. Among recent contracts may be mentioned 900 tons for a building at 7 West Forty-fifth street to Ravitch Brothers; 1150 tons for the New York Plaza of the Manhattan bridge to the Hay Foundry & Iron Works; 170 tons for the Boston & Maine at Lynn, Mass., to the Boston Bridge Works; 140 tons for the same road to the Pennsylvania Steel Company, and 120 tons also for the Boston & Maine to the American Bridge Company. Plain material still obtains 1.76c., New York, for mill shipments for delivery in two or three months, but 1.66c., New York, for delivery in the third quarter. From store the price is 2.25c., New York.

Steel Plates.—Of leading interest is the apportionment of the Pennsylvania purchase of cars as follows: Cambria Steel Company, 4500 cars; American Car and Foundry Company, 2500 cars; Pressed Steel Car Company, 2500 cars; Standard Steel Car Company, 2300 cars; Ralston Steel Car Company, 500 cars. Another closure is that of the Atlantic Coast Line for 1000 box

and 300 flat cars to the Barney & Smith Company. The Pennsylvania order is interesting because of the wider distribution than ordinarily obtained under the former administration; it is believed that better deliveries was in part a reason for the distribution to the different car builders. No change in the general plate market was learned, and general quotations remain 1.66c., New York, for mill shipments in the third quarter, and 1.76c. for sheared plates and 1.81c. for universal plates in two or three months.

Iron and Steel Bars.—Weakness has definitely developed in iron bars, considerable having been sold in 15-ton and larger lots at 1.60c. at mill. Steel bars are, however, stronger, if anything, two large producers declining to take any business from inquirers not already customers. An indication of the situation is obtained in a subway contractor's trying to contract because of the failure to get reinforcing bars as rapidly as expected from the producer with which he first contracted. Steel bars remain at 1.40c., Pittsburgh, or 1.56c., New York, delivered at the convenience of the mill, which in the case of some sizes means not more than three months, owing to a particular mill's not being heavily sold, but they remain 2.10c. from store; shipments in one or two months go at prices between the extremes, though this business does not total very much. Refined iron bars are quoted at 1.70c. to 1.80c., New York, and from store are 2.15c.

Cast Iron Pipe.—New business is not active, either as regards public buying or the placing of orders by private interests. Quotations on carload lots of 6-in. are continued at \$25 to \$26 per net ton, tidewater.

Old Material.—Transactions are few and unimportant. Consumers are not only making no effort to buy but appear to be willing to purchase only when inducements are offered. The market therefore presents indications of going to a lower level of values. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.00 to \$11.50
Heavy melting steel scrap	11.00 to 11.50
Relaying rails	22.50 to 23.00
Rerolling rails	14.00 to 14.50
Iron car axles	24.00 to 24.50
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.00 to 13.50
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	12.00 to 12.50
No. 1 yard wrought, short.....	11.00 to 11.50
Light iron	5.00 to 5.50
Cast borings	8.00 to 8.50
Wrought turnings	8.25 to 8.75
Wrought pipe	10.25 to 10.75
Old car wheels	15.00 to 15.50
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate	8.75 to 9.25
Locomotive grate bars	8.00 to 8.50
Malleable cast	11.00 to 11.50

Ferroalloys.—The market continues quiet, with 80 per cent. ferromanganese quoted nominally at \$65, Baltimore, by first hands for both spot and future delivery, although small resale lots have sold down to \$64. Ferrosilicon, 50 per cent., is unchanged at \$75, Pittsburgh, for carloads; \$74 for 100 tons and \$73 for 600 tons and over.

Cincinnati

CINCINNATI, OHIO, February 11, 1913.—(By Telegraph.)

Pig Iron.—The market is quiet, although the tonnage under negotiation is probably larger than for the previous week. The northern Indiana inquiry for 2000 tons of mixed Southern and Northern foundry iron is yet unclosed and there is another request for quotations from the same territory for 500 tons of Southern foundry. A southern Ohio melter is expected to close for about 600 tons of Southern foundry and there is also an inquiry from Indiana for approximately the same tonnage both for second quarter shipment. No very strenuous efforts are being exerted to get business for the last half; however, it is known that \$13.50, Birmingham, and \$16.50, Ironton, can be done with a few interests for that delivery. Spot shipment prices in the South appear to be soft, and a small quantity of resale iron has been offered lately below the quotation of \$13.50, Birmingham basis. Practically the largest sale reported covers 1500 tons of mixed Northern and Southern foundry iron for last half shipment to a Central Western consumer, and there is the usual run of small orders for filling in. It is rumored that a tentative inquiry for a round tonnage of basic has been put out by a nearby mill, but this cannot now be confirmed. Malleable is in better demand and the price about keeps pace with Northern No. 2 foundry.

Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft..	\$17.00 to \$17.50
Southern coke, No. 2 foundry and 2 soft..	16.75 to 17.25
Southern coke, No. 3 foundry.....	16.50 to 17.00
Southern, No. 4 foundry	16.25 to 16.75
Southern gray forge	16.00 to 16.50
Old silvery, 8 per cent. silicon.....	20.70 to 21.20
Southern Ohio coke, No. 1.....	18.20 to 18.70
Southern Ohio coke, No. 2.....	17.70 to 18.20
Southern Ohio coke, No. 3.....	17.45 to 17.70
Southern Ohio malleable Bessemer.....	17.70 to 18.20
Basic, Northern	18.20 to 18.70
Lake Superior charcoal	19.25 to 19.75
Standard Southern car wheel	27.25 to 27.75

(By Mail)

Coke.—Prices have declined, as the demand is very weak, but there has hardly been enough coke changing hands to establish a market. Prompt shipment Connellsville grades of 48-hr. coke are offered at \$2.75 to \$3 per net ton at oven, which are also the quoted figures on contract business. The Pocahontas and Wise County fields are about on the same basis. Foundry coke is slow, and from \$3.75 to \$4 represents the average quotation in all three fields.

Finished Material.—The railroads are buying considerable track material, and it is also reported there is a good demand for both iron and steel bars from this source. Sheets are very firm, and the difficulty in making deliveries on rush orders is a vexing one with both the mills and jobbers. Local warehouse prices on steel bars are unchanged at 2.05c. to 2.15c. and on structural shapes around 2.15c. to 2.20c. There is an excellent business in sight for manufacturers of twisted rods for reinforcing concrete purposes.

Old Material.—The market continues weak, an abnormally large amount of scrap being offered. The foundry and rolling mill consumption continues about the same as usual, and a recovery in pig-iron prices may tend to improve the scrap market. The minimum prices given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum figures are dealers' prices f.o.b. yards:

	Per Gross Ton.
Bundled sheet scrap	\$10.50 to \$11.00
Old iron rails	14.00 to 14.50
Relaying rails, 50 lb. and up.....	21.00 to 21.50
Re-rolling steel rails	13.00 to 13.50
Melting steel rails	11.00 to 11.50
Old carwheels	12.75 to 13.50

	Per Net Ton.
No. 1 railroad wrought	\$11.00 to \$11.50
Cast borings	7.00 to 7.50
Steel turnings	7.50 to 8.00
No. 1 cast scrap	10.75 to 11.25
Burnt scrap	7.75 to 8.25
Old iron axes	18.25 to 18.75
Locomotive tires (smooth inside) ..	12.00 to 12.50
Pipes and flues	7.50 to 8.00
Malleable and steel scrap	9.25 to 9.75
Railroad tank and sheet scrap.....	6.25 to 6.75

Metal Market

NEW YORK, February 11, 1913.

The Week's Prices

	Cents Per Pound for Early Delivery.					
	Copper, New York.			—Lead—		—Spelter—
	Electro-lytic.	Tin.	New York.	New York.	St. Louis.	New York.
Feb. 6.....	16.00	15.75	48.50	4.35	4.20	6.65
7.....	16.00	15.75	49.45	4.35	4.20	6.65
8.....	16.00	15.75	49.35	4.35	4.20	6.50
10.....	16.00	15.87½	49.55	4.35	4.20	6.50
11.....	16.00	15.75	49.30	4.35	4.20	6.50

Copper is lower, dull and still unsettled. Tin is quiet but a trifle stronger. Lead is unchanged. Spelter, after further declines, is weak. Antimony is lower and very dull.

New York

Copper.—The market has been uncertain in the last week and it has been difficult to get definite prices which might be regarded as accurate. There have been many rumors as to prices, but most of these have lacked confirmation. On Friday especially the market was upset and practically everyone interested was on that day eagerly seeking information. In many quarters a substantial decline has been expected as a result of the January report of the Copper Producers' Association showing an addition to stocks of nearly 18,000,000 lb., but those who expected a heavy decline were disappointed. There were rumors on Friday that one of the big agencies had cut prices, but this proved to be untrue. On Thursday, the day previous to the report, actual business was done at 15.75c. and 15.62½c., cash, New York, for prompt delivery. At no time during the week has there been any considerable amount of trading. What looked very much like manipulation intend-

ed to inspire some degree of confidence in the market caused London prices to advance £1 7s. 6d. yesterday, but in the afternoon 7s. 6d. was lost and today it is down further 17s. 6d., bringing the London price to practically what it was before the upward movement started. The metal is quoted in New York to-day at 15.75c., cash, 30 days, delivered, with resale lots harder to find. A consumer to-day bid 15.25c., delivered, cash, 30 days, for early March, but much doubt was expressed as to the ability to find copper at these figures. It is certain at the moment that March, April and May metal must be offered around 15.25c., delivered, cash, 30 days, or consumers cannot be interested. Lake copper is absolutely nominal at 16c. The price of copper in London to-day is £66 15s. for spot and £66 17s. 6d. for futures. Exports this month total 10,086 tons.

Pig Tin.—A fair business was done on both Thursday and Friday, but only fair as the total amount traded in would not exceed 200 tons. On Saturday and again on Monday the market was dull. The only feature in the metal at the present time is an increasing fear that the month may bring another shortage in spot supplies, such as existed a few weeks ago and resulted in a demand for premiums from those who were short and had contracts to cover. Already it is apparent that there will be no excessive supply of spot metal available toward the end of this month and the covering of unprotected contracts for February delivery has already begun. The price in New York to-day is 49.30c. and in London £223 10s. for spot and £221 10s. for futures. The arrivals this month total 1330 tons and there is afloat 2985 tons.

Lead.—While the demand is light, the market is unchanged at 4.35c., New York, and 4.20c., St. Louis. An effort was made by some interests a few days ago to obtain 4.22½c., St. Louis, but consumers found they could buy at the lower price and prices became regular again.

Spelter.—This metal has been subject to a further decline and is to-day dull and weak at 6.50c., New York, and 6.35c., St. Louis, with a probability of this price being shaded a few points.

Antimony.—There is declared to be practically no new business in this metal and prices are to a considerable extent nominal. The range quoted is 9.35c. to 9.50c. for Cookson's, 9c. to 9.25c. for Hallett's, and 8.25c. to 8.75c. for Chinese and Hungarian grades. It is apparent that considerable quantities of antimony were bought on the rise of the market a few months ago and the needs of consumers have been amply supplied by deliveries on contracts.

Old Metals.—Prices have declined from last week's level. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	15.25 to 15.50
Copper, heavy and wire.....	14.75 to 15.00
Copper, light and bottoms.....	13.50 to 13.75
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	13.00 to 13.25
Clean brass turnings	8.50 to 8.75
Composition turnings	12.00 to 12.25
Lead, heavy	4.25
Lead, tea	4.00
Zinc, scrap	6.00

Chicago

FEBRUARY 10.—Copper values have slumped and the market presents a wide range of quotations. Spelter prices also are decidedly lower. Dealers are offering correspondingly lower prices for scrap metals. We quote as follows: Casting copper, 16c.; Lake, 16.50c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 50.75c.; small lots, 52.50c.; lead, desilverized, 4.30c. to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.45c.; Cookson's antimony, 11.25c., and other grades, 10.50c. in small lots; sheet zinc is \$8.75, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14c.; copper bottoms, 12c.; copper clips, 13c.; red brass, 12.25c.; yellow brass, 9c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 33c.; tinfoil, 38c.; block tin pipe, 43c.

St. Louis

FEBRUARY 10.—Spelter has continued to ease off, and is now quotable at 6.30c. to 6.50c., according to time of delivery. Lead is a little firmer at 4.20c. to 4.25c. Other metals are quoted as follows: Tin, 49.55c. to 50.05c.; Lake copper, 16.35c. to 16.60c.; electrolytic copper, 16.10c. to 16.50c.; antimony, Cookson's, 10.10c. In the Joplin district the severe weather has continued to help to reduce supplies, especially from the shallower dig-

gings, but there has been no material change in prices of zinc blend. The range for 60 per cent. remains at about \$45 to \$50 per ton, with the top price easy at about \$53 for the choicest lots. In calamine the range for 40 per cent. ore remains at \$24 to \$26, while the best lots sell around \$30. The shut down of the mines to force better prices has not yet been determined, but is still being talked of. Lead ore is a little better at \$24 for 80 per cent. We quote miscellaneous scrap as follows: Light brass, 6.50c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 13c.; tin foil, 36c.; pewter, 25c.; zinc, 4c.; lead, 3.50c.; tea lead, 3c.

British Iron Market Weaker

Some Tin Plate Mills Closed—Canadian
Inquiry for 50,000 Tons of Rails

(By Cable)

MIDDLESBROUGH, ENGLAND, February 11, 1913.

The general tone of the market seems weakening. Pig iron is irregular and new buying is reserved. Some tin plate mills have closed. American independent steel-works are now open to sell semi-finished steel for export for delivery for May and onward. The stocks of warrant iron total 230,403 tons, against 233,958 tons last week.

The Grand Trunk is inquiring for 50,000 tons of rails and British mills have booked 15,000 tons for South Australia. We quote as follows:

* Cleveland pig iron warrants (closing Tuesday) 64s. 9d. against 65s. 2d. one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 65s. 3d., a decline of 6d.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 15s.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s. 6d.

German basic steel bars, f.o.b. Antwerp, £6 1s., a decline of 1s.

Steel bars, export, f.o.b. Clyde, £8 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 7s. 6d.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 7½d. against 14s. 9d. one week ago and 15s. two weeks ago.

Personal

President James A. Farrell addressed New England jobbers at the annual dinner of the New England Iron and Hardware Association held at Boston, Thursday evening, February 6.

P. A. E. Guerber has been elected manager of sales of the Guerber Engineering Company, Bethlehem, Pa.

R. Willans, of the Dow Pump & Diesel Engine Company, San Francisco, Cal., has arrived from Europe to take charge of the Diesel engine department of the works.

J. H. D. Eagan has been appointed general sales manager of the Hess Steel Castings Company, Withespoon Building, Philadelphia.

B. T. Williams has been appointed night superintendent of the La Belle works of the American Sheet & Tin Plate Company at Wheeling, W. Va.

James H. Barr, president National Supply Company, Pittsburgh, has returned from a trip to Mexico. While there he visited an oil well which has been producing 22,000 barrels of oil per day for more than two years. The oil is used for fuel purposes.

Charles W. Hubbard, Jr., for 16 years president of the American Axe & Tool Company, Glassport, Pa., has resigned. He has been succeeded by J. P. Kelly, who is also president of the Kelly Axe & Tool Company, Huntington, W. Va. Other officers elected were W. B. Lockett, vice-president; William Richards, treasurer; F. H. Brewer, secretary. The foregoing officers and John W. Hubbard were elected as the board of directors.

W. N. Donaldson, formerly superintendent of transportation and labor for the Brier Hill Steel Company, Youngstown, Ohio, has resigned to accept a similar position at the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, succeeding Isaac O. Brown, resigned.

Thomas E. Davey, formerly connected with the Finished Steel Company, Youngstown, Ohio, has been elected president of the State Board of Administration of Ohio.

Isaac M. Scott, former president of the La Belle Iron Works, Steubenville, Ohio, who resigned recently to fill a similar position with the Wheeling Sheet & Tin Plate Company, Wheeling, W. Va., was tendered a complimentary dinner last week by the directors and operating heads of the La Belle Iron Works. He will make his headquarters in Pittsburgh.

C. D. Marshall, McClintic-Marshall Construction Company, Pittsburgh, has gone to Panama, where his company has been doing a large amount of work for a year or more.

W. P. Snyder, president Shenango Furnace Company, Pittsburgh, has gone to Palm Beach, Fla.

A. E. Douglas has resigned as purchasing agent of the Rutland Railroad Company and Rutland Transit Company, Rutland, Vt., to take effect March 1, after which date he will handle the supply department of the E. A. Kinsey Company, Cincinnati, Ohio, dealer in mill and mine supplies and machinery.

Robert P. Lewis, who has for some years been the treasurer and general manager of the Blake & Johnson Company, Waterbury, Conn., has transferred his interest and resigned as an officer. He has been succeeded as treasurer by the president, John P. Elton. The secretary, Lancaster P. Clark, has been appointed general manager.

Mr. W. G. Ross, for many years manager of the Cleveland Tack Works, has severed his connection with that company and associated himself with the H. C. Tack Company, Cleveland, Ohio, having purchased the interest of C. C. Paine and been elected secretary and treasurer.

Raymond C. Semple, formerly with the Belmont Iron Works, and Charles Wilson, lately treasurer of the Philadelphia Iron Works, have formed a partnership as engineers and sales agents, with an office in the Perry Building, Philadelphia. They will handle iron and steel.

James R. Petley, assistant treasurer and purchasing agent, National Brake & Electric Company, Milwaukee, Wis., has resigned his position to become associated with L. R. Riebs, manufacturers' agent, Milwaukee, and will enter upon his new duties February 17.

E. R. Hamilton, of Bloomington, Ill., has joined the Northwestern Steel & Iron Company, Eau Claire, Wis., as stockholder, director and assistant general manager of works. K. Rosholt, president and general manager, has retired from active work, and his duties are assumed by Thorman W. Rosholt and Mr. Hamilton.

Albert H. Pittelkow has resigned as secretary and manager of the Davis-Hansen Pump Company, Oshkosh, Wis., to assume an active part in the management of the Schmidt Milling Company. He is succeeded by Walter H. Grundy.

F. H. Daniels, Worcester, Mass., chief engineer of the American Steel & Wire Company, sails for Egypt this week. He is recovering from the effects of an operation performed in the latter part of last year.

W. A. Comstock, president Cleveland Wire Spring Company, Cleveland, Ohio, has gone to Florida to spend the remainder of the winter.

Dividends Declared

The American Steel Foundries, quarterly, ½ of 1 per cent. The last previous disbursement was 1¼ per cent., paid May 15, 1911.

The Studebaker Corporation, regular quarterly, 1¼ per cent. on the preferred stock, payable March 1.

The American Radiator Company, stock dividend of 10 per cent. on the common stock, regular quarterly, 2 per cent. and 2 per cent. extra on the common and regular quarterly, 1¼ per cent. on the preferred. The common dividends are payable March 31 and preferred rector have called a special meeting of stockholders is payable February 21. A year ago 10 per cent. stock dividend was declared on the common stock. The dividend for March 5, to authorize an increase in the common stock from \$7,000,000 to \$9,000,000.

Fire Protection of New England Foundries

An Investigation Into General Conditions, Fire-Fighting Apparatus, Insurance Rates, Etc.

A committee of the New England Foundrymen's Association, B. M. Shaw, George P. Aborn and Henry A. Carpenter, recently made a report to that association on fire protection. The report is, nearly in full, as follows:

Your committee sought information in regard to the fire hazard in foundry properties from all members of our association and also from some New England foundries without the organization. Replies were received from 133, but in 15 cases there was no foundry in operation, thus reducing the number of cases to be studied to 118.

General Construction

In 50 cases the construction of the foundry was brick and concrete or brick and concrete in different portions. In 22 cases construction was a combination of wood and brick. Forty-six of the 118 foundries (39 per cent. of total) were built of wood. These are mainly the smaller plants, and some of them carried no insurance.

The roof coverings of the different foundries were made up of a great variety of materials, and in many cases different portions of the buildings were covered with different kinds of roofing material. In some cases as many as three different materials were used for a single plant. In order to determine just how the different materials were distributed the committee has taken the cases where subdivision was made and credited each material with a unit, just as in those cases where only one material was used. On this basis the totals will be somewhat greater than the number of plants studied. As the cases of duplication, however, involve usually the largest plants this method is believed to represent closely the general conditions.

In general the roof construction is fairly good, but in spite of this the greatest care should be taken to guard against sparks from the cupola. This is an ever present danger and a hood over the stack will do much to keep sparks from flying to the roofs of buildings or on the flasks. If possible the parts adjacent to the cupola should be absolutely fireproof, and it should be someone's duty after the cupola is dropped to go over the foundry to see that no tiny fire has started.

The tar and gravel roof is the most numerous of all, being found on 75 foundries out of 118. Slate roofs appeared in 39 cases; iron or tin clad in 17 cases. The remaining 18 cases included asbestos, plank, paroid paper, reinforced concrete and two cases of shingled roofs, both of these being on wooden buildings. The roof trusses were in all cases either wood or steel, except that in a few cases the two materials were both used in a single foundry. Wood trusses predominate with a total of 91 against 30 for steel trusses, and six cases where the information was lacking.

Wooden Leantos and Flasks

In 65 cases wooden leantos, either against the foundry building or close to it, make an external hazard which naturally results in raising the insurance rate. Forty-eight foundries report no leantos of this character, and in five cases no information was given.

The external risk produced by wooden flasks is considerable in many cases, and as a general proposition these flasks have no protection which would reduce the hazard. Eighty-seven foundries reported flasks piled in the open yard without protection; in only five of these cases were they at a distance from the foundry. Eight foundries reported flasks in the yard with protection of some sort, which would tend to minimize the danger to the foundry itself in case these flasks should be set afire, either from smoldering sparks from a previous heat or any other way. In 23 cases there were either no flasks stored outside or no information given.

Private Fire-Fighting Apparatus

One of the cheapest and best methods to protect against these external hazards is to have a small hose house with the hose already attached to the hydrant. This enables the workmen to get water quickly to any blaze that starts outside the foundry in that immediate vicinity. If there

are external hazards at points somewhat remote from the hose house, it is well to have a small carriage in the house so that one man can get a line of hose quickly to the hydrant nearest the blaze. In this house can also be stored the various bits of extra fire-fighting equipment needed, including extra hose, axes, spanners, play-pipe, bars, etc.

In planning for any such equipment as outlined above it is essential to remember that all the fire-fighting equipment in the world is of no value unless it is always in good working order and in the same place so that it can serve its purpose the second it is needed, for fire waits for no man. To secure this end, several of the larger foundries report that they use inspection slips which have to be filled out periodically by the man in charge of the fire-fighting equipment. These slips not only state the apparatus to be inspected, but also mention the exact location, so that there may be no time lost in hunting for a piece of hose, an axe or some other bit of apparatus which is not where it should be.

Public Fire Department

In all but three cases the public department is available for coping with a fire. In a number of these cases, however, the department is at a distance and in some cases it consists of a volunteer department instead of a regular paid force. Quite a number of cases show village departments and in a few instances reliance to a certain extent is placed upon hand engines, there being no power operated engines or steamers available except at a considerable distance. All of these items are, of course, strongly in evidence in the ultimate insurance rates charged those foundries.

The water supply for these various properties consists usually in city pressure or village pressure, as the case may be. This has been studied in the same way as the construction, and hence shows an excess number of plants under the same basis as before. City pressure is the reliance in 84 cases out of 118. In 20 cases hydrants on the property and belonging to the plant, furnish water, but in many of these the pressure is simply that from the city mains, although in some cases it is from an elevated tank or a reservoir with gravity pressure. Gravity tanks are mentioned as a source of supply in 17 cases, 13 of which are among the 32 plants protected by automatic sprinklers. Fire pumps, some of them automatic, are used in 16 different plants, many of which use them simply as an adjunct to other sources of water supply. In only one case was a pressure tank mentioned, that being the only supply to one of the automatic sprinkler systems.

Automatic Fire Protection

Thirty-two of the plants reported automatic sprinklers and 13 of this number reported automatic alarms as well. Of the 32 sprinklered foundries, two reported water supply from three independent sources, 15 reported from dual sources and 15 from a single source, although it is possible that in some of these latter cases connection may have been made to two different city mains on different streets. A general study of the conditions has shown that the plants using automatic sprinklers have very much lower insurance rates than any of the others, the difference being a large percentage of the rate required of those plants which are not thus protected. It might be noted here that the sprinklers are placed in the most modern and largest plants; 22 out of 32, for instance, being in the plants which are built of brick, or brick and concrete, and only ten of them in the plants of less robust construction.

Insurance Rates

In a great many cases it was difficult to obtain from the replies a satisfactory basis for analysis of insurance rates. Either the rate was given for a blanket policy covering a complete range of buildings of which the foundry was only one, or the rate was given without any valuation or amount of insurance carried, in which case it could not be averaged in with the other figures because of variations in sizes of plants, etc. There were, however, 73 cases ranging all the way from one plant which carried only \$500 of insurance to two plants which carried \$650,000 each. The rates varied all the way from 4¼c. per \$100 of insurance on one plant which was thoroughly protected by

automatic sprinklers, automatic alarm, and two or three sources of water supply, to \$4.28 per \$100 of insurance (a rate 18 times as high) upon a small plant constructed of wood and without fire-fighting facilities. Nearly all of the wooden buildings carried a rate in the neighborhood of 1 per cent., whereas the highest net rate in the sprinklered plants was 25c. per \$100, or one-quarter of 1 per cent.

The figures offer food for a great deal of thought. In the first place, it will be noted that the total insurance carried on the 73 plants for which figures were available amounted to \$4,029,339, on which the insurance premiums aggregated \$17,158 per annum, or an average rate of 42½c. The very great effect of the large sprinklered plants in bringing down this average figure will be at once apparent. What should be called to mind right here, however, is the relation between valuations and insurance demands on the plants differing in construction and protection. For this purpose the above figures are shown in the accompanying table:

Class	Number	Valuation	Premiums	Rate
Brick and concrete.....	18	\$322,389	\$3,116	.96½
Brick and wood.....	12	356,750	4,683	1.31¼
Wooden buildings.....	30	330,450	6,187	1.87¼
Sprinklered.....	13	3,019,750	3,172	.10½
	73	\$4,029,339	\$17,158	.42½

The third item shows 30 plants with a total valuation less than one-ninth that of the 13 sprinklered plants, and yet they are paying practically double the annual insurance premiums. In other words, they are paying 18 times as high a rate as are the better protected foundries. Even the foundries housed in concrete or brick buildings but not equipped with sprinklers show an immense difference in rate over those which are sprinklered.

Recommendations

The committee cannot recommend too strongly that all members take all possible means to avoid danger from fire. By this we mean that particular care should be taken to keep all rubbish cleaned up; to see that all flasks before being stored are entirely free from smouldering particles; to see that all possibility of the spreading of a fire from one portion of the plant to another be done away with. In all cases where flasks are stored against the outside of the building or close to it, or where wooden lean-tos are against the building, the windows back of and above these hazards should receive proper protection. If it is not feasible to fit metal sash with wired glass panes operating in metal casings, either a sheet iron screen should separate the hazard from the property or whenever possible the wooden hazards should be removed far enough from the building to do away with danger of spreading fire.

Fire pails located at several convenient points should be always full of water and never used for any other purpose. The use of portable chemical extinguishers, of some one of the several types recommended by the underwriters, is heartily approved.

In all cases where it is not financially possible to install automatic sprinklers and automatic alarms, even with the insurance saving which follows this installation, standpipes with hose already connected should be located at points where they will be readily accessible, even with a fire raging in the building. Where feasible it is suggested that a pump taking suction from a river or pond is a good source for standpipes when a tank would be too expensive. Valves for these pipes should be capable of operation from the outside of the building or from a fully protected location inside. It is frequently feasible to fit a small valve room totally incombustible in itself and in its contents, which can be entered from the outside of the building, and which would contain in a frost-proof compartment the necessary valves, hose, etc., to fight even a heavy fire. Where sprinklers are used on the dry-pipe system these connections could well be made in the dry-pipe valve room, but it is very important that this room, whether used for the sprinkler system or for the hose system, should be accessible under any and all conditions which might arise.

Most small foundries have city water for a drinking supply. This can be very inexpensively converted into a fire-fighting auxiliary by merely making a few small hose connections for 1-in. pipe to which is attached from 50 to 200 ft. of hose with a nozzle already connected. This hose

should be coiled on a swinging rack. By thus utilizing the means at hand a serious fire may often be held in check until the fire department arrives, while small blazes can be entirely extinguished.

Conclusion

The committee feels that if this study should have the result of inducing any of our members to improve the conditions in their plant, either by reducing the fire hazard or by providing secure means for taking care of a fire when once it starts, its labors will be amply repaid. The mere question of insurance savings due to improved conditions from the fire standpoint is, we recognize, quite subsidiary. The fact that a single crippling fire might mean loss of business for months, carrying with it the possible loss of established trade, and seriously hampering other departments of a large establishment, must always far overshadow any question of insurance premiums as such. The fact, however, that both ends may be served at the same time and by the same means, makes it extremely important that all members should use, to as large an extent as practicable, all the means at hand for cutting down the risk of destructive fire and at the same time cutting down their insurance payments.

Itinerary of Iron and Steel Moving Pictures

The moving pictures in Rogers, Brown & Co.'s "Mine to Molder" series were shown by Henry B. B. Yergason to the students at Sheffield Scientific School, New Haven, February 7, and to Connecticut foundrymen at the same place on the evening of February 8. The entertainment was given February 11 at the plant of the General Fire Extinguisher Company for the company's employees and for foundrymen of Providence and vicinity; also at the meeting of the New England Foundrymen's Association, Exchange Club, Boston, February 12. Later appointments announced are for February 15, before the Massachusetts Institute of Technology, Boston; February 18, at the auditorium of the Engineering Societies' Building, New York City, before New York foundrymen and other guests, admission being by ticket; February 21, before the engineering and metallurgical departments of the Columbia School of Mines, New York. Mr. Yergason's itinerary later takes in Albany, Troy, Schenectady, Buffalo, Erie, Cleveland, Detroit and Ann Arbor, Mich.

The Dover Steel Company, briefly referred to last week, has applied for a charter under the laws of Ohio with a capital stock of \$1,200,000, the incorporators being Albert P. Meyer, W. M. Parkin, E. M. S. Young, Archibald Smith and H. C. Meyer. It will erect at Canal Dover, Ohio, an open-hearth steel plant with two 75-ton furnaces, a three-high bar mill, six hot sheet mills and other necessary equipment for the manufacture of high grade hot and cold rolled steel sheets, electric sheets and open-hearth sheet bars, selling its surplus of bars in the open market. It expects to have an initial capacity of about 400 tons of open-hearth steel per day in the shape of sheet bars and 150 to 200 tons of steel sheets. The building of the plant will be pushed as fast as possible.

The American Steel Foundries enjoyed a much more prosperous year in 1912 than for several preceding years, especially 1911. A statement just issued shows the income for 1912 to have been \$1,588,766, against only \$167,807 in 1911, and a surplus in 1912 of \$777,756 after deductions for fixed charges and the writing off of \$442,507 for depreciation, whereas 1911 showed a deficit of \$514,802, with only \$199,111 allowed for depreciation. The surplus left in 1912 was equal to 4.52 per cent. on the stock.

Leo J. Flynn, special examiner for the Interstate Commerce Commission, received a complaint last week from five concerns, namely, the Columbia Steel Company, Enterprise Foundry Company, Warman Steel Casting Company, C. L. Best Gas Traction Company and Puget Sound Iron & Steel Works, alleging the existence of an unreasonable freight rate on molding sand from Missouri River points to the Pacific coast, asking that it be reduced from 50c. to 40c. per 100 lb.

The American Problem of Industrial Accidents

A German Critic's Views Not Altogether Enthusiastic—Machinery Safeguarding in Germany and the United States

We have already referred to the visit to the United States of Dr. Th. Schuchart, of Thyssen & Co., Mulheim-Ruhr, Germany. Dr. Schuchart, who is the efficiency engineer of this well-known firm, visited a great many steel works, machine shops and foundries in this country in making an investigation of working conditions. He made a special study of accident prevention and accident compensation, and the conditions under which work is done in their relation to economic production. In a contribution to the monthly publication of the German Engineers' Society Dr. Schuchart makes some interesting comments on the present status in the United States of accident prevention and insurance against accidents. Below we give some extracts from the article and a liberal synopsis of other portions of it. It will be noticed that Dr. Schuchart considers the German system of compensation for industrial accidents and of preventive measures in shops and factories to have furnished the United States with very much that has been adopted in this country so far in these directions:

The conception which the American has had of the safeguarding of workmen from accidents is astonishing—a conception which has its ideal embodied in the unrestrained expenditure of every force, without consideration worth mentioning for the life and health of the laborer. A large number of industrial establishments still manifest complete indifference to the effective prevention of accidents. What prevented for a long period an understanding of the problem was the method of conducting business, which is based on extreme freedom and which finds its explanation in the political and commercial immaturity of the country on the one hand and in the rapid rate of development on the other.

A unified procedure toward legal interference or even the establishment of fundamental laws is extremely difficult on account of the constitutional relation of the Federal government to the several States. Added to this are the differences in the various State constitutions under which legal questions are approached oftentimes from entirely different viewpoints. The individual States have the fullest authority in the regulation of their internal affairs, so long as there is no direct interference with interstate interests. Under such circumstances the questions of social care are left to the regulation of the various States. There thus remains open to the realm of Federal supervision only the field which embraces the welfare of employees in the general government or in industrial undertakings of an interstate character, especially such as railroads.

Germany's System an Influence

In the meantime here, also, as in other countries, the progress of culture and the advance in general welfare have had their refining effect in a great degree on social sentiment. Under the direct influence of what social legislation has achieved in Germany, there developed gradually a popular sentiment favorable to the socializing of working conditions. The employers did not offer open resistance to this change in public opinion nor did they aid in increasing it. The opposing interests confined themselves largely to political movements. If in so short a time they have agreed on measures that are not sweeping but are yet a decided modification of old conditions, it may be assumed with confidence that the much freer relation in America between the employers and employees has had a beneficial influence on the leaders of industry. If, in conjunction with the recent marked tendency toward improvement in American industrial products, there is a growing sentiment for the improvement of working conditions and the protection of employees against impairment of earning ability, credit must be given to the better appreciation by the employer of factors which make for effective work.

One cannot now offer the faintest conjecture as to the progress the realization of this idea will make. It is certain that the most optimistic expectations will be disappointed.

Whatever has been accomplished in systematic prevention of accidents was inspired almost entirely by the influence of very large and progressive concerns. Alongside of these is a large number of fairly large and really fine establishments in which the direct influence of Germany is plainly demonstrable; especially such concerns as regard accident prevention and safety appliances as luxuries which can be dispensed with, but which add to the reputation of those who adopt them.

The sense of moral responsibility of the employer for an accident occurring during working hours is growing, as is proved by the fact that for some time there have existed private inspection bureaus which are engaged in the supervision of business concerns with a view to the prevention of accidents.

Meanwhile it would be wide of the mark to regard the growing sentiment for the betterment of the laborers' conditions as alone the deciding factor. Certainly it is not a feeling of humanity only which animates the employer. Safeguarding against danger from accidents takes on also an economic aspect, and it appears that large significance must be given to this point of view in the higher mode of life of the American than of the German laborer.

Measures for the Prevention of Accidents

The old method of having industrial establishments inspected by State labor commissioners has not availed much in the United States. This inspection is by no means uniform and its efficacy in the various States is very differently regarded. Meanwhile there is an inclination to increase materially the number of inspectors by the appointment of women, and in addition to an increase in their duties to enlarge their authority. Their duties consist principally in the supervision of the general working conditions, such as hours of labor, woman and child labor, safety from fire, ventilation, lighting, etc., and further in the superintendence of a great number of varied activities, as for example, work at home, warehouses, workmen's homes, elevators, licenses, boiler inspection. Their activities embrace in general examination and supervision of the working conditions from the point of view of health. In a few of the States their work has resulted in real success. This cannot be said, however, of some others, since political conditions often result in indefinite restrictions and half measures.

So far as the narrow domain of accident prevention is concerned, the enforcement of the laws is entrusted to the factory inspectors. But these laws, insofar as they are carried out, afford only insufficient protection to the laborer and are limited to various specified classes of accidents. An important reason for the insufficient regulation by the Government is in reality that the introduction of measures for the prevention of accidents was, until recently, by no means regarded with favor by the American working classes. The men feared that they would be hindered in the discharge of their duties. In some cases, also, the management, from the top down, is indifferent to safety measures.

Safety Provisions in German and American Machines

The first effective measures had their rise in an entirely different source. The manufacturers of machine tools who, through their relations to the European markets, became acquainted with the safety measures that obtained in Germany, in seeking to improve their products in every respect, began to examine their machines with reference to their liability to cause accidents. And while they made decisive advances in reconstruction and carried out the same ideas whether the machines were intended for foreign or domestic use, the dangers from accidents, at least in the higher grades of work, were considerably lessened without the American workman or employer being aware of it.

It is interesting to compare the aim of the work of German machinery builders in accident prevention with

that of the American manufacturers. The German was strongly impelled, in the realization of his ideal of safety, by the law's demands and by the practice of industrial inspection. The American is inclined, however, to develop his machine on such lines as to make it possible for an apprentice to turn out a relatively important piece of work, one which in Germany would be entrusted to a machine or skilled man. The American also demands easy access to the machine for inspection and adjustment. To accomplish this, however, it is desirable that the workman be able to see plainly the important parts of the machine. Therefore, the parts are not enclosed, but are left exposed, or so protected that they cannot be observed while in operation, which is in strong contrast to the German engineer's method. He attempts to exclude everything from the possibility of any contact during operation that might cause injury under any circumstances. It is not surprising, therefore, that to-day in the American machines of the best producers we find means for protection which according to German ideas do not fulfill their object, but with which the most careful American will scarcely part.

The Steel Corporation's Work

It is certainly an extraordinary service which the Steel Trust rendered that it was able at its immense plants in South Chicago to awaken the active interest of its employees in this question. The foremen, and a little later the workmen, were commissioned to investigate existing possibilities of accidents and to propose remedies. From this came a movement taking in all the plants and looking to permanent measures for the prevention of accidents. The proposed remedies were discussed in common, and even though involving the installation of unusual apparatus were immediately put in force. An extraordinary diminution of accidents was the direct result.

In order to centralize the work of accident prevention there have sprung into existence "safety departments" in all of the trust's plants. Their duties, besides co-operation with the preventive means already mentioned, are to continually scrutinize the plants for possibilities of accidents, to devise remedies, to inspect all new construction and undertakings from the standpoint of safety, to investigate the accidents of their own and others' plants, and to bring conspicuously mounted drawings or photographs to the careful attention of the workmen. From the introduction of this co-operative work, looking toward safety in all the corporation's plants, a very fruitful interest has been awakened. Hand in hand with this work there is joined, of course, a constant propagation of the idea of protection in all kinds of work, and by means of signs, premiums, etc., the effort is made to arouse more and more the laborers' appreciation of the great work of safety inspection.

Effect of Safety Measures on the Worker

As an example of the importance the steel trust attaches to accident prevention is the motto placed over the principal entrance to the great works of the Indiana Steel Company at Gary:

CAREFUL MEN ARE USUALLY EFFICIENT,
CARELESS ARE NOT EFFICIENT.

The deep psychological effect of safety from accidents is evident in economies as well as in increased productive power. Whoever has observed nervous efforts fully appreciates what quiet and steadiness mean in the final results. Just as the fact that the service fairly demanded by the management is best rendered under conditions that are healthful and unobjectionable—though this is sometimes lost sight of—similarly one cannot overlook the beneficial influence of poise based on kindness and the intelligent application of safety appliances. "*Ruhe bringt stilligkeit.*" (Quiet brings steadiness). This is already deeply impressed on the mind of the American man of affairs. And in the best establishments they are to-day investigating and improving their working conditions with a recognition of the fact that stability and steadiness in work play an exceedingly important role in producing profitable results.

The company with the greatest force of unskilled labor and apprentices is the one that has the most accidents, according to experience. Here comes in the wholesome influence of the steel trust, and also its educational influence on other concerns and industries. The results, up

to the present time, lead one to expect the best as regards the further development of accident preventive measures under private initiative.

Accident Legislation

It is customary now for the law to apply itself on the one hand to minimizing danger from accidents and on the other to the economical insurance of those who may meet with accidents. The awakening of the social conscience in the legislation of the United States developed at about the same time. While the legal measures for the lessening of accidents present a variegated picture, and while State factory inspection, in spite of a general tendency to broaden its field, is of varying value and character, the laws aiming at insurance show general uniformity. In the efforts of the private corporations are evidences of a clearness in understanding fundamentals which should be credited largely to a study of German social legislation. Since July 1, 1911, in the state of Nevada, the first accident insurance law has been in effect, and in quick succession there appeared similar laws in New Jersey, Wisconsin, California, Washington, New Hampshire, Ohio, Kansas, Illinois and Massachusetts. The states generally satisfy themselves by prescribing certain compensations for various injuries by accident, and leave it to the employers to protect themselves through insurance companies. Only in Ohio, Washington and Massachusetts has the State itself taken insurance in hand. A curious provision exists in Ohio by which the employee contributes from his wages to the expense of the insurance.

According to the old English legal tenet, hitherto accepted, the employer was subject to action for damages in the case of an accident to an employee, but the burden of proof devolved upon the latter to show that the accident was traceable to the negligence of the employer. The practice of the courts, however, developed a number of restrictive interpretations. The most important of these were that the employee was expected to assume into the bargain any normal danger, as well as that due to complicity of his co-laborer, and to renounce entirely any action for damages due to his own negligence. Any legal claims remaining were subjected to the usual course of legal procedure. So insurance companies, whose custom it was to insure the employer against the consequences of his responsibility, naturally left nothing undone, by the help of the technicalities of legal specialists, to render void the duty of compensation. The unusually heavy cost of the prosecution always turned out the same for the complainant, i. e., that he was either non-suited, or in case he won, at the best recovered only about half damages.

Features of the New Legislation

Legislation found this a difficult situation to cope with, and the states which had developed industrially did not manifest a desire to find a way out. Nevertheless, a very good solution was found. While they left submission to the law to the personal decision of the employer, certain definite and especially hazardous callings excepted, nevertheless, in cases where he preferred to remain under the old law, they brought about greater effectiveness by means of a complete or nearly complete annulment of the restrictive interpretations before mentioned. The result has been thus far what was to be expected, and the employers submitted themselves in large numbers to the operation of the new law, so that it will be only a question of time when all accept this way out of the difficulty.

Under the responsibilities of insurance thus imposed on the employer, compensation goes into effect for death as well as for total or partial disability within definite time limits. The compensation is based as usual on the average weekly or yearly wages. Minimum and maximum rates are fixed throughout and often definite supplementary benefits such as medical aid, medicine and burial expenses. There is the peculiarity that the indemnification is limited in the total which it can reach or is confined to a definite number of years.

Special attention has been given to the provisions which limit the compensation for injuries, etc. In all cases the aim has been to practically cut out the assistance of the courts in which, in comparison with the old system, a decided step in advance must be acknowledged.

After determining the classes of persons covered by accident insurance, they have turned their attention next to provision for the callings that are especially hazardous,

and have decided on compulsory co-operation for these. On the contrary, for cases in which the employers desire to remain under the old revised legal conditions, and further, for all kinds of callings which in themselves do not contain any especially dangerous activities, the old custom prevails.

Good Points in Wisconsin Laws

In the State of Wisconsin, recognized as progressive, whose legislation and administration deserve high recognition on account of their soundness and thoroughness, they have already to-day placed under a commission, known as the Industrial Commission, the supervision and enforcement of all laws referring to questions of labor, including those covering accident prevention and insurance. In order to develop accident prevention they have arranged it so that factory inspectors have larger authority. The commission has named several committees for the consideration of technical measures for the prevention of accidents, in which sit a number of workmen from the industries concerned. They named as chief inspector the former manager of the safety department of the International Harvester Company, who has the reputation of being one of the best in the profession. Simplicity and easy adaptability are demanded of the technical safety measures taken up by the committees, and in order to make them popular they are given constant publicity at all industrial establishments by means of drawings and photographs.

The state of Wisconsin provides definite rules which stipulate the compensation for death, or permanent and partial disability resulting from accidents. The compensation, where judicial procedure is eliminated, is decided upon a legal examiner, appointed especially for this purpose by the Industrial Commission, who treats with the parties on the basis of an investigation on the ground and with expert medical counsel. Appeal from his decision can be made to the commission which closes the case finally. Up to this time the examiner has brought to a successful conclusion 95 per cent. of the cases.

The Industrial Commission of the state of Wisconsin is a rare example of the legislative and executive power combined. It is questionable whether this will bring successful results. It is certain, however, that it is a good plan to unite in one authority the executive duties relating to labor questions. Thus far the state itself has not acted as an insurance company and the example of Wisconsin will have its effect in other states. Meanwhile the voices of those who desire state insurance are very numerous and they calculate by this agitation to cause a considerable lowering of insurance premiums, though the state supervision of insurance companies in the United States is generally thorough.

The Standard Steel Company

Following affirmation by a referee in bankruptcy of the sale at auction in Birmingham, Ala., of the Southern Iron and Steel Company, now known as the Standard Steel Company, James Bowron has issued a statement, in part as follows:

"The property of the Southern Iron & Steel Company will pass into the hands of the Standard Steel Company, which has just been organized under the laws of Alabama, with a nominal capital, although an immediate increase in the capital is contemplated. Satisfactory arrangements have been made for temporary financing, advances having been arranged for through the Bankers Trust Company of New York. Sufficient money has been provided with which to keep the plants of the company in full operation as at present.

"The directors of the new company are as follows: James Bowron, H. Sanborn Smith and A. R. Forsyth of Birmingham, Harry Bronner of Hallgarten & Co., New York; S. H. Voorhees, agent of the Royal Bank of Canada, New York; N. G. Higham of Post & Flagg, New York, and Arthur M. Wickwire, secretary of the reorganization committee. The existing officials of the Southern Iron & Steel Company were elected to the offices of the new company: President, James Bowron; vice-president, H. Sanborn Smith; secretary and treasurer, A. R. Forsyth; assistant secretary, Arthur M. Wickwire."

Obituary

GEORGE E. HOLTON, president Bryden Horse Shoe Company, Catsauqua, Pa., died February 10 in St. Elizabeth's Hospital, New York City, aged 45 years. He was born in London, England, and came to America in 1886, securing employment in the Pencoyd Iron Works, Philadelphia. In 1889 he became inspector for G. W. G. Ferris & Co., Pittsburgh, in Eastern territory. He became interested in the manufacture of horse shoes in 1892. He leaves a widow. The funeral will take place at Catsauqua on Thursday at 2.15 p. m.

HERBERT C. BOURNE, treasurer of the Bourne-Fuller Company, Cleveland, Ohio, was stricken with apoplexy while attending a reception at the Colonial Club in that city February 7 and died the following morning. He was born in Hyannis, Mass., 50 years ago, and had lived in Cleveland since early boyhood. He was a graduate of Harvard University and a member of the Union, Euclid, University and Mayfield clubs of Cleveland.

S. N. KNIGHT, a pioneer foundryman of Sutter Creek, Cal., died January 13, aged 75 years. He was first interested in Donnelly's foundry about 30 years ago, and had for many years conducted Knight & Co.'s foundry.

ARTHUR SCHOELLKOPF, president Hydraulic Power Company, Niagara Falls, N. Y., died at Miami, Fla., February 3.

A Reported Tin Plate Consolidation

For several months some promoters have been at work on a project to consolidate into one company a number of the leading tin plate concerns in the Pittsburgh and nearby districts. The companies approached are the McKeesport Tin Plate Company, Phillips Sheet & Tin Plate Company, Carnahan Tin Plate & Sheet Company, Standard Tin Plate Company, Waynesburg Forge & Tin Plate Company and Alcania Company, the last operating a dipping tin plate plant at Avonmore, Pa. The promoters desire to have an open-hearth steelworks to furnish tin bars to the new company, should the consolidation go through, and for this purpose have been trying to get an option on the plant of either the Youngstown Sheet & Tube Company or the La Belle Iron Works. Neither of these concerns has given an option on its plant, but what may be done in this direction is at present uncertain. The statement that E. P. Crawford, president of the McKeesport Tin Plate Company, would be elected president of the La Belle Iron Works is incorrect. The statement is made that an option has been secured by the promoters on the plant of the McKeesport Tin Plate Company at \$7,000,000. As the plant has 22 mills, this is at the rate of over \$318,000 a mill, which is certainly a liberal price. Whether the consolidation will be put through is by no means assured. It would seem that the present is not an opportune time for deals of this kind.

The Morgan Construction Company, Worcester, Mass., has received the contract for the construction of a wire-drawing plant for the Monterey Iron & Steel Company, Monterey, Nueva Leon, Mexico. The works will operate in connection with the company's steel mills at Monterey, and will be the first wire mills in Mexico.

At the regular monthly meeting of the American Society of Engineer Draftsmen, to be held in the Engineering Societies Building, New York City, February 20, at 8.15 p. m., Prof. John Francis Woodhull, Columbia University, will give a stereopticon lecture on "Electricity."

Last Saturday the McClintic-Marshall Construction Company, Pittsburgh, made its last shipment of structural steel from Baltimore for the Panama Canal, making over 60,000 tons of fabricated material it has supplied from its Rankin works to the canal.

Furnace A of the Warwick Iron & Steel Company, Pottstown, Pa., leased by the Eastern Steel Company, Pottsville, Pa., will be blown out this week for relining. It will be idle about a month.

The Bethlehem Steel Company blew in last week furnace B at its Lehigh plant, South Bethlehem, Pa., and all six furnaces are now in operation. A seventh is now under construction.

The Machinery Markets

In several machinery distributing centers the quiet improvement in buying heretofore noted continues, but generally the market is without features of unusual interest. While there have been a few good sales in New York, conditions are unchanged with small transactions making up the bulk of business. In Philadelphia sales aggregated a fair total in the last week and much better buying by the railroads is anticipated. Orders of from one to five tools have been sufficient in number to make trade satisfactory in Cleveland. Cincinnati conditions have undergone little change, and aside from trade continuing fairly good the outlook is for heavy buying by the railroads. The export trade continues dull, as might be expected at this season. In Detroit there has been a marked improvement in volume of business in all lines; inquiries are plentiful and some of them are from abroad. Business in Milwaukee, where the local demand is particularly good, is gaining. Trouble from flood waters has ceased in the Central South, but wintry weather is holding back activity in many directions. Quiet conditions continue in St. Louis, and while dealers are not hopeful of any immediate betterment, they are optimistic with regard to Spring trading. The demand for irrigation equipment is still heavy in Texas, where the spring planting season has begun and agricultural machinery is in good call. On the Pacific coast more business was done last month than in any other January in several years. Inquiries are especially strong for contractors', quarrying and mining machinery, while the Southern Pacific Railroad is buying tools in small lots.

New York

NEW YORK, February 11, 1913.

Two or three excellent orders, one of which represented an expenditure of \$25,000, and was placed by a New England company, have been received by a corresponding number of machinery houses in New York in the last week, but the general tone of the market has been quiet. Miscellaneous and scattered orders and a fair number of inquiries of the same character have supplied the machine tool trade with most of the encouragement it has received. There still appears to be a holding back of important business which was expected to materialize before this time. The Baltimore & Ohio Railroad has an inquiry out for a turret lathe with 6 1/4-in. spindle capacity. While not of great importance in itself, this inquiry has directed attention to the increasing number of inquiries for this type of machine, a fact which is regarded as interesting because of the limited number of manufacturers who make them. The New York Central Railroad is inquiring for a 1 1/2 x 18-in. turret lathe. The Sprague Electric Company, Bloomfield, has placed an order for five automatic turret lathes. Other of the few features displayed by the present market are an improvement in the demand for second hand machinery and a rather good call for rubber making and working equipment. Manufacturers' representatives in New York report that the demand for gas producer plants is very good, some of the makers having all the orders they can fill for some months to come. A good part of this activity is due to the higher prices of fuel oils. Manufacturers of locomotive cranes have made a goodly number of sales of late, many of these machines going to Canada, while the domestic demand has been fair.

The Fiat Automobile Company, Poughkeepsie, N. Y., is erecting an addition to its plant which will give it 30,000 sq. ft. of additional floor space.

The plant and equipment of the Dutchess County Lime Company, Dover Plains, N. Y., has been taken over by the Dutchess County Hydrate Company. The new company, of which Paul M. Pierson, of Scarborough-on-Hudson is president, has completed plans for the enlargement of the lime manufacturing plant to three times its present capacity and also for the construction of a new hydrating plant adjoining.

The Cohoes Gas Light Company, Cohoes, N. Y., is completing plans for the establishment of an electric generating plant of 25,000-hp. capacity on a site on the Mohawk River recently granted to it by the State Land Board. The cost of the proposed plant is estimated at about \$1,500,000.

The city of Oswego, N. Y., will build and equip a sewage disposal plant to cost \$25,000 from plans of Rudolph Hering of New York City. C. H. Snyder is city engineer.

A. E. Bonesteel, Troy, N. Y., has had plans completed for a three-story factory building, 40 x 120 ft., which he will erect on River street, and bids are now being received by the architect, W. E. Clark.

The Magnet Knitting Mills, New Hartford, N. Y., which recently increased its capital stock from \$50,000 is completing plans for increasing its production by the installation of additional machinery.

The O. M. Edwards Company, Syracuse, N. Y., has been incorporated with a capital stock of \$1,250,000 by O. M. Edwards and others of that city, to engage in the manufacture of railroad supplies.

The Art Silk Yarn Company, Kingston, N. Y., has been incorporated with a capital stock of \$500,000 by Bernard W. Wilkins and C. Adolf Greiner of Larchmont, N. Y., and Charles A. Herrmann of Kingston. The company will establish a plant at Kingston, where artificial silk yarn from cotton will be manufactured by a patented process controlled by the company. Bernard W. Wilkins is president.

Work has been commenced on the rebuilding of the two shops at the plant of the Atlas Crucible Steel Company at Dunkirk, N. Y., the frame work of which was recently blown down while in process of erection. The new buildings will be 60 x 100 ft. each, of steel and corrugated iron.

The city of Binghamton, N. Y., is having plans prepared for an addition to the filtration plant by the Norwood Engineering Company, Florence, Mass., increasing the capacity of the plant from 1,000,000 gal. to 8,000,000 gal. The superstructure will be built from plans of architect S. O. Lacey. The entire cost of the addition is estimated at \$100,000.

The Endicott Johnson Company, Endicott, N. Y., has plans in preparation for extensive additions to its tannery to be 95 x 700 ft., one and four story. The one-story portion will be 300 ft. in length and the four-story portion 400 ft.

The erecting building of the Power Specialty Company's plant, Cumminsville, a suburb of Dansville, N. Y., was destroyed by fire February 4. Tools, some machinery, patterns and manufactured machines were destroyed. The portion of the plant destroyed will be rebuilt at once.

The Display Fixture Company, Inc., Rochester, N. Y., has filed articles of incorporation with \$25,000 capital stock to manufacture display fixtures for stores, etc. The directors are J. R. English, W. R. Bruce and J. A. Nolan of Rochester.

The Modern-American Laundry Company, Buffalo, recently incorporated with a capital stock of \$35,000 will erect a laundry building and equip it with up-to-date machinery. J. S. Kohn is president.

The Fiber Factory Company, Buffalo, has been incorporated with a capital stock of \$15,000. The incorporators and directors are H. M. and W. H. Sickler and C. G. Moore, who are also directors and officers of The Buffalo Corrugated Container Company. The new company will occupy a portion of the latter company's plant at Imson street and the Lehigh Valley Railroad. Considerable new machinery will be installed.

The King Sewing Machine Company, Buffalo, W. Grant King, president, has completed plans for a one and two-story brick foundry building to cost \$40,000 to be added to its plant at Rano and Welland streets and the Lackawanna Railroad.

The J. P. Devine Company, Buffalo, has let the contract for the construction of its new manufacturing plant at Clinton street and the Erie Railroad, consisting of an erecting and machine shop, a boiler shop and office building, to cost \$60,000.

The main building of the Erie Forge Company's plant, Erie, Pa., was destroyed by fire February 2, with a loss of \$200,000 on building and machinery. Replacement will be made at once.

Catalogues Wanted

The National Lead Company "Steel Package Plant," Granite City, Ill., has recently added a new catalogue

cabinet to its office equipment and is desirous of receiving catalogues from manufacturers.

William S. Roe, 17-19 Mechanic street, Newark, N. J., dealer in supplies for manufacturers, plumbers and heating engineers, desires catalogues and price lists pertaining to those lines.

Philadelphia

PHILADELPHIA, PA., February 10, 1913.

The business of the week shows a fair total in that there have been more orders closed involving small groups of tools, principally in multiple drills and lathes; the number of tools sold, however, has been less than in the preceding week. There has been an absence of any marked inquiry for tool equipment. The demand from the railroads has been practically at a standstill. Active buying in this direction is anticipated in the spring, as both merchants and manufacturers have from time to time been furnishing estimates on miscellaneous lots of equipment to railroads in the district, against which very few orders have been placed. Continued activity of industrial plants at high rates is expected to result in good buying of tools for replacement purposes before the year end. But a moderate volume of business is moving in second-hand equipment. Moderate installations of power plants are under negotiation, while several large power installations are in prospect. Both iron and steel foundry plants are actively engaged.

The Morris Iron Works, Frederick, Md., has changed its name to the Morris Iron & Steel Company. It is understood that the capital stock of the company has been materially increased and that a steel casting plant will be installed.

The Thompson Electric Company will make application February 24 for incorporation under the Pennsylvania laws, with a capital stock of \$200,000, to engage in the manufacture, purchase and sale of general electrical machinery and apparatus and articles made of metal and other materials. The company is now conducting business under the same name at 1606 Sansom street, Philadelphia.

The Finance Company of Pennsylvania has asked for preliminary estimates on a 20-story office building to be erected on South Penn square. Preliminary plans call for the installation of elevators and extensive power plant equipment.

Plans have been submitted to the Town Council of Norristown, Pa., for the building and equipping of a sewage disposal plant, subject to the approval of the State Board of Health. Tentative plans call for a plant capable of treating 2,000,000 gal. of sewage daily.

The Richmond Radiator Company has acquired the factory of the Reading Radiator Company, Reading, Pa., at Front street and the Lebanon Valley Railroad, in that city, which will be operated in connection with its plants at other points. This company has also recently purchased its present warehouse at North American and Dauphin streets, from the Model Heating Company.

New England

BOSTON, MASS., February 11, 1913.

Business is running along a level that changes in no important way. The demand for machinery is consistently good. The heavier tools are finding a readier market than in 1912. The local dealers hope that the decision of the United States Supreme Court favoring the United Shoe Machinery Company in important points of the anti-trust prosecution, will cause the company to withdraw from its policy of holding back on all extensions, both of buildings and of equipment. Before the suit was brought the Beverly plant was one of the largest and most consistently constant buyers in New England.

The Sanford Riley Stoker Company, Ltd., Worcester, Mass., has completed an arrangement with the B. F. Sturtevant Company, Hyde Park, Mass., by which the Riley self-dumping underfeed stoker will be built at the Hyde Park plant. R. Sanford Riley is president of the new corporation; Aldus C. Higgins is treasurer, and George N. Jeppson secretary.

The Spencer Wire Company, Worcester, Mass., has purchased the wire goods business of Julian F. Bigelow of that city.

The Motor Boat and Engine Show at Mechanics' Building, Boston, indicates a rapidly growing interest in kerosene engines and in fact in all motors using liquid fuel other than gasoline, largely due to the sharply increasing cost of the latter. Practically every

builder of marine engines is at work on a kerosene type, and some very satisfactory motors of this class are on the market. The gas producer engine—most economical of all—is also being given the closest scientific attention.

The Consolidated Lighting Company, Montpelier, Vt., has prepared plans for the development of 3000 hp. by the creation of a hydroelectric plant at Molly Falls, extending the property just purchased of the Molly Falls Light & Power Company, Marshfield, Me. Surplus power will be sold for manufacturing purposes in Montpelier.

The Worcester Electric Light Company, Worcester, Mass., is planning to increase its plant by the installation of a 5000-kw. turbine generator set, two condensers, additional boilers and other machinery, at an estimated cost of \$250,000.

The Ford Motor Company proposes to build an erecting shop at Cottage Farm Bridge, near Boston, to contain 100,000 sq. ft. of floor area, the purpose being the assembling of cars.

The Hope Foundry Company, Warren, R. I., is planning to establish a new foundry at Auburn, R. I., adjacent to the new works of the Standard Machinery Company, Providence, R. I.

The Scovill Mfg. Company, Waterbury, Conn., will be building a casting shop 125 x 160 ft., of brick and steel.

The White Adding Machine Company, New Haven, Conn., has been incorporated under Connecticut laws with a capital stock of \$1,000,000, to take over the business of the Connecticut Computing Machine Company, the factory of which will be occupied, and the White Adding Machine Company, a Tennessee corporation. The incorporators are Max Adler, former Governor Rollin S. Woodruff, Roger P. Tyler, E. S. Swift and Charles Wales.

Additions to general manufacturing industries of New England include the following: Portland Shoe Mfg. Company, Portland, Me., additional factory 60 x 103 ft., six stories; Pawtucket Hosiery Company, Central Falls, R. I., mill 100 x 108 ft., two stories; Weybosset Company, Central Falls, R. I., building 80 x 180 ft., one story; Fisk Rubber Company, Chicopee Falls, Mass., factory buildings 90 x 202 ft., two stories, and 90 x 242 ft., three stories, both of brick and steel construction; cement house 20 x 115 ft., one story, and blacksmith shop.

Chicago

CHICAGO, ILL., February 10, 1913.

The Kimball Electric Company, Chicago, has entered into a contract with Roy D. Kehn for the construction of a two-story building, 125 x 148 ft., to be erected at the corner of Western avenue and Erie street. Estimated cost is \$40,000. The company manufactures alternating current, single-phase motors.

The Vacuum Exhaust Engine Company, 208 East Fifty-seventh street, Chicago, has been incorporated with a capital stock of \$50,000 to manufacture and deal in machinery. The incorporators are Ralph L. Burdick, Clinton A. Johnson and Ole C. Olson.

The Seek Automatic Regulator Company, Chicago, has been incorporated with a capital stock of \$15,000 by J. S. Seek, John Yungerman and William A. Jennings. Engines will be the product of the new company.

The Joslyn Mfg. & Supply Company, Chicago, has increased its capital stock from \$150,000 to \$300,000.

Universal Battery Company, 69 West Washington street, Chicago, has been organized with a capital stock of \$25,000 for the manufacture of electrical instruments and appliances by Louis C. Mowrey, Harry I. Holton and Adolph Silberman.

The Como Wrench Company, 105 West Monroe street, Chicago, has been incorporated with a capital stock of \$10,000 for the purpose of manufacturing tools, machinery and hardware. The incorporators are John C. Farwell, Walter M. Fowler and Dayton Ogden.

The Schulze Baking Company, 33 North La Salle street, Chicago, will erect a new building on Garfield boulevard and Wabash avenue in the near future. The structure is to be 170 x 360 ft., five stories, of reinforced concrete and will be equipped with the most modern machinery.

The plant of the Cribben & Sexton Stove Works at 720 North Sacramento avenue, Chicago, was damaged by fire February 6. The estimated loss is \$100,000.

The Northern Utilities Company is now receiving bids through Engineers Sargent & Lundy, 80 West Jackson boulevard, Chicago, for the power plant to be erected at Dixon, Ill.

The Charles Birdoux Machine Company, 314 North May street, Chicago, has been incorporated with a capital stock of \$10,000 by Benjamin Samuels, North Nathan and C. A. Aaron. The company will manufacture sewing machines.

Leitelt Bros., 6338 Madison avenue, Chicago, has been incorporated with a capital stock of \$10,000 to manufacture and deal in brass, bronze and copper castings. The incorporators are Edward Leitelt, Matthew J. Hanor and Charles F. Leitelt.

The Alton Steel Company, Alton, Ill., which is building an open hearth plant billet mill and cotton ne and hoop mills, has contracted for a large part of the necessary equipment, but a number of purchases are yet to be made.

The Ideal Milling Company, Moline, Ill., with \$25,000 capital stock, has been incorporated by F. H. Headen, L. Earl Schofer and William T. Lamont and has plans for a plant.

The Meadows Mfg. Company, Pontiac, Ill., has increased its capital stock from \$30,000 to \$50,000 for the purpose of increasing its manufacturing capacity.

The Wabash Railroad is now receiving bids on the tools and machinery for its new locomotive shops at Decatur, Ill. Unofficially, about \$250,000 has been appropriated for this purpose.

The plant of the T. G. Northwall Company, Sioux City, Iowa, was devastated by fire on February 1 with a loss of \$70,000.

The Twin City Rapid Transit Company, Minneapolis, Minn., has announced the expenditure of nearly \$2,000,000 in improvements in the near future. These will include a 15,000-kw. unit, a 10-way conduit between St. Paul and Minneapolis, and the construction of 70 new truck cars.

The Traction Plow Guide Company, Long Prairie, Minn., has been incorporated with a capital stock of \$10,000 to manufacture plow guides, machines, tools and mechanical devices. The incorporators are H. S. Johnson, Arthur P. Lathrop and Walter D. MacLeith, all of St. Paul.

The Diamond Calk Horseshoe Company, Duluth, Minn., has let the contract for an addition to its factory at Forty-seventh avenue and Third street, to cost \$10,000. New machinery at an estimated cost of \$50,000 will be installed.

Milwaukee

MILWAUKEE, WIS., February 10, 1913.

The volume of business is reported to be gaining and general conditions are satisfactory. The demand for power equipment is maintaining itself well, and the local demand for machine tools is particularly good. Reports from all over the State give news of prospective expansion in industrial lines.

The Kissel Motor Car Company, Hartford, Wis., is completing the work of renovating and equipping the former Romadka trunk works in this city as a branch automobile and truck plant. While the branch plant here equals in floor space only 50 per cent. of the present acreage used for actual manufacturing at Hartford, the site of the former Romadka plant has sufficient vacant acreage to make possible extensions which would more than double the size of the Kissel works at Hartford and Milwaukee combined. The new Milwaukee plant will be ready for operation within a month. Practically all of the tool requirements have been filled and new buying will be done only as needed. The former Romadka power equipment is being used intact, but may be increased before many months of operation.

The Koehring Machine Company, Thirty-first street and Concordia avenue, Milwaukee, is ready to start construction work on an administration building designed by Van Ryn & DeGelleke, architects, and to cost \$15,000. It will be of concrete and brick, two stories, 36 x 63 ft. Since its establishment the Koehring Company has not had an office building directly connected with its works, the executive business being done at 616-624 Germania Building, Milwaukee. Philip Koehring is secretary and manager. The company manufactures concrete mixers, with steam engines as motive power.

The Waverly Mfg. Company, Jefferson, Wis., manufacturing the Jefferson motorcycle, formerly the P. E. M., is considering the erection of a three-story building as an addition to its present works.

The International Hoist Company, Antigo, Wis., a consolidation of the Pioneer Iron Works and International Hoist Company, and manufacturing hoists, cranes, engines, etc., has increased its capital stock

from \$50,000 to \$150,000 to provide means for handling its increasing business. The company abandoned its former works last spring and established entirely new works on a larger site, but with the increased facilities is unable to cope with its orders.

The Wiiboken Mfg. Company has been organized at Milwaukee by George A. Knaak, until now engaged in the manufacture of mechanical specialties of his own invention and design at Oshkosh, Wis. The new Milwaukee company is capitalized at \$50,000 and has leased the shops at 248-252 Reed street, which have been equipped for the production of a large line of specialties, including moving picture machines, air compressors for automobiles and other purposes and general automobile and machine shop devices.

It is likely that the North End Foundry Company, Milwaukee, will not rebuild its foundry but will take over the well-equipped plant of the Beaver Dam Foundry Company, Beaver Dam, Wis. Negotiations are now going on for a long-term lease or outright purchase. The Beaver Dam Foundry, producing gray iron castings, has not been in operation since the first of the year because of slack demand.

The Nortmann-Duffke Foundry Company, Milwaukee, is preparing to erect a new building, 60 x 120 ft., two stories, to be used as a perforating shop. The company has already placed equipment orders for this unit. The list included a large perforating press which will punch a hole 2 1/4 in. in diameter through sheets up to 1 1/4 in. in thickness. The press will take a 10-ft. sheet.

The Wehr Steel Company, Forty-fifth and Gordon avenues, Milwaukee, has purchased considerable new equipment, including a side-blow converter to be built and erected by the Whiting Foundry Equipment Company, Harvey, Ill.

The Prime Steel Company, Milwaukee, sustained a loss of \$17,500 by fire in its Dutcher works, foot of Mitchell street, February 2. The fire caused a week or more of delay in business, which is being made up rapidly in the other plants of this company at Milwaukee.

The Milwaukee Steel Foundry Company, 157-175 Virginia street, Milwaukee, has increased its capital stock from \$10,000 to \$150,000 to finance a comprehensive plan of expansion, the details of which will not be issued for some weeks.

The Gardner Machine Company, Beloit, Wis., has decided to erect a large addition to its plant, work to begin April 1.

The Besley Mfg. Company, Beloit, Wis., manufacturer of tap, tools and disc grinders, has purchased land adjoining its present plant, on which two new buildings are to be erected.

The city of Monroe, Wis., is contemplating improvements in its water system.

Detroit

DETROIT, MICH., February 10, 1913.

Improvement in the volume of business in the machinery and machine tool trade is very marked and the betterment seems to extend to almost all lines of equipment. Inquiries are plentiful both from local sources and from the state at large and cover a widely diversified range of requirements. In special lines a demand is noted for mining and sawmill machinery and canning plant equipment. Second-hand machinery is moving quite freely. Electrical equipment is in good demand and considerable business in this line is expected from various municipalities in the early spring. Power plant equipment is moderately active. The extremely cold weather has caused a cessation of nearly all outdoor work, but several important projects in construction lines including the building of three large hotels are expected to come before the trade shortly and contractors are looking for an early resumption of activity.

The Edward G. Budd Mfg. Company, Philadelphia, Pa., has acquired the plant of the defunct Grabowsky Power Wagon Company at Mt. Elliott avenue and the Dunn road, Detroit. The property includes a four-story manufacturing building and a power plant and extensions to the plant costing \$200,000, will be begun at once. The company manufactures steel automobile bodies. Theodore H. Millington is in charge of the local office of the company.

The Pittmans & Dean Company, Detroit, will build two new ice-making plants costing about \$12,000 each. The buildings will be one story, of brick construction and will be 100 x 133 ft. and 92 x 126 ft. respectively.

The Kales-Haskell Company, Detroit, operating a sheet-metal stamping and tool-making plant, has awarded the contract for a large addition to its plant at 445-53 Lafayette Boulevard.

The plant of the Detroit Auto Dash Company, 517 Beaubien street, Detroit, was damaged by fire February 1 to the extent of about \$10,000. Replacements will be made at once.

The stock and equipment of two of the subsidiary companies of the General Motors Company has been acquired by the Puritan Machine Company, Detroit, and the equipment will be installed in a new factory which the company will erect. It is reported that it is planning to engage in the manufacture of automobiles in addition to its present line of motor parts.

The West Side Brewery Company, Detroit, has completed plans for the erection of a three-story addition to its plant to be used as a wash building. Suitable equipment will be installed.

The Eastern Michigan Edison Company, Detroit, has filed an application with the State Railroad Commission for permission to issue bonds to the amount of \$600,000, the proceeds of which are to be used to provide for improvements to and equipment for the company's several plants.

The Timken-David Brown Company, Detroit, has been incorporated with a capital stock of \$250,000 to manufacture worm drive gears and worm wheels. The stockholders include Eugene W. Lewis, Herbert W. Alden and Lewis H. Paddock.

The Liberty Mfg. Association, Detroit, has been incorporated with \$10,000 capital stock by H. L. Nelson, E. M. Robinson and C. R. Robertson. The new company will engage in the manufacture of fire extinguishers and other mechanical devices.

The Hellinich Mfg. Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture brass and wooden specialties. The incorporators are Carl Hellinich, Anthony Rademacher and Clement Nagel.

The F. B. Eby Handle Company, Detroit, has been incorporated with \$10,000 capital stock to operate a factory for the manufacture of wooden handles and other specialties. The incorporators are Francis B. Eby, John A. Matheson and Fred H. Bryant.

The Power Efficiency Company, Detroit, has been incorporated by Raphael Herman, Samuel J. Herman and Harold H. Emmons with a capital stock of \$100,000. The new company proposes to manufacture and deal in mechanical devices of all kinds.

W. R. Roach & Co., Hart, Mich., fruit canners, have completed plans for and will soon begin the erection of an addition to their plant. The new building will be 90 x 160 ft., four stories. Some equipment will probably be required later. They will also establish a branch plant at Stanton, Mich.

The Wilcox-McKim Company, Saginaw, Mich., has been organized by Merrill M. Wilcox and others to manufacture automobile accessories. Plans for a factory have been completed.

The Cook Mfg. Company, Albion, Mich., has been reorganized as the Cook-Kneeland Engine Company and has merged with the Kneeland Engine Company, Battle Creek, Mich., manufacturer of gasoline engines, which supplement the Cook line of windmills, engines, etc. The capital stock is \$80,000. John A. Rathbone, Albion, is vice-president and general manager.

The Hot Blast Feather Company, Grand Rapids, Mich., has sold its present factory and is preparing to build a new plant on a more extensive scale.

The taxpayers of Clayton, Mich., have voted to bond for \$2,600 for municipal lighting.

The Michigan Hearse & Carriage Company, Grand Rapids, Mich., has increased its capital stock from \$30,000 to \$45,000. The new capital will be used in building a large addition to the company's plant.

The Kalamazoo Stove Company, Kalamazoo, Mich., has added the building of furnaces to its line of stoves and has acquired a tract adjoining its present plant to provide for the erection of the furnace factory.

The Buchanan Electric Steel Company, Buchanan, Mich., will install a new five-ton electric furnace in its plant.

The Eddy Paper Company, Three Rivers, Mich., has increased its capital stock from \$160,000 to \$400,000 and will enlarge its capacity.

The Boehme & Rauch Company, Monroe, Mich., manufacturer of binders, fibre containers, etc., has increased its capital stock from \$500,000 to \$800,000.

The United States Graphite Company, Saginaw, Mich., paint manufacturer, has increased its capital stock from \$500,000 to \$750,000.

The Cheboygan Stave Company, Cheboygan, Mich.,

has been organized with \$6,000 capital stock to erect and equip a stave and heading mill.

The King Saxton Clamp Company, Battle Creek, Mich., has been organized with \$25,000 capital stock to manufacture and deal in metal and rubber goods of all kinds.

Cleveland

CLEVELAND, OHIO, February 10, 1913.

The machine tool trade continues quite active. Dealers report the receipt of a very satisfactory volume of orders in the week ranging from single tools to lots of 4 or 5. Considerable new inquiry has come out from manufacturers in various metal-working lines who are planning plant extensions and need additional machinery equipment. Machine tool builders report a good volume of small orders. A good volume of business has come recently to makers of punches and shears from steel fabricating shops. The railroad demand is still light. Second-hand machinery is moving fairly well.

The Marion Steam Shovel Company, Marion, Ohio, is in the market for considerable machine tool equipment. This will include eight engine lathes equipped for motor drive, about six planers, about 15 radial drills and several miscellaneous tools. The lathe list is as follows, the remainder of the list not yet having been sent out:

- One 24-in. x 12-ft. engine lathe, taper attachment, fitted with steel independent jawed chuck.
- One 24-in. x 12-ft. engine lathe.
- One 24-in. x 14-ft. engine lathe with attachment as noted on item one.
- One 24-in. x 14-ft. engine lathe.
- One 27-in. x 12-ft. engine lathe with attachment as noted on item one.
- One 27-in. x 12-ft. engine lathe.
- One 18-in. x 7-ft. engine lathe with attachment as noted on item one.
- One 18-in. x 7-ft. engine lathe fitted with independent jawed chuck.

The William McClellan Company, Cleveland, has been incorporated with a capital stock of \$50,000. The company will take over the business of William McClellan & Co., file manufacturers, 2444 Hamilton avenue. Some plant extensions are being planned.

Bids will be received by the Director of Public Service, Cleveland, February 18 for transformers for the Municipal lighting plant.

The Willys-Overland Company, Toledo, Ohio, will build a new foundry. The contract for the building has been placed.

The Defiance Welding Company, recently organized in Defiance, Ohio, will establish a plant for the manufacture of steel poles and metal specialties. H. D. Bokop is president and F. A. Bokop is secretary and treasurer.

The Garford Engineering Company, Elyria, Ohio, has been incorporated with a capital stock of \$100,000 to manufacture aluminum under a new process. A. L. Garford of Elyria, former president of the Garford Automobile Company, is at the head of the enterprise. Walter F. Brown and several other Toledo men are interested in the company which will probably establish a plant in Toledo.

The Cleveland Clutch Company will shortly move its plant from Cleveland to Ravenna, Ohio, where a new two-story brick plant is being erected that will provide the company with 5000 sq. ft. of floor space.

The Chapman Steam Specialty Company, Canton, Ohio, maker of radiator valves, has been incorporated with a capital stock of \$10,000 by S. Dewitt Chapman, E. H. Lamiell and others.

The Crooks-Uhle Company, Bucyrus, Ohio, has increased its capital stock from \$10,000 to \$30,000 and has changed its name to the Bucyrus Forge & Machine Company. The company has decided to engage in the drop forge business and will install a steam hammer, furnace, boiler and some other equipment.

The Board of Education, Cleveland, is in the market for five 42-in. and one 48-in. manual training wood turning lathes.

It is announced that the Chandler Motor Company, in which Detroit men are mostly interested and which has recently been organized, will build a plant in Cleveland, the site having been secured along the Belt Line Railroad. The officers of the company are: F. C. Chandler, president; C. A. Emise, vice-president and sales manager; Samuel Rear, treasurer, and W. S. M. Mead, secretary.

The Wright Wrench Company, Canton, Ohio, will enlarge its plant by the erection of an addition 50 x

100 ft. orders have been placed for some additional machinery and power equipment.

The Toledo Machine & Tool Company, Toledo, Ohio, builder of presses, has received bids for a factory addition which will be about 100 x 160 ft., three stories, of brick and steel construction. The company does not expect to buy any machinery at the present time.

The Cuyahoga Spring Company, Cleveland, has been incorporated with a capital stock of \$20,000 by John H. Van Horn and others. The company will take over the business of the Cuyahoga Spring Works and extend the business either by enlarging the present plant or building a new one.

A new factory will be built in Toledo, Ohio, by the C. Well Mirror Company. It will be located on Smead avenue, near Bancroft street. A one-story brick building, 40 x 120 ft., will be erected. Thomas H. Tracy, Sr., is president.

The Royal Cut Glass Company, Toledo, Ohio, is a new concern that has been organized with a capital stock of \$10,000 to manufacture cut glass and has established headquarters at 507 St. Clair street in that city. Aiken Dupois is president and treasurer and William C. Hitzke is secretary.

Indianapolis

INDIANAPOLIS, IND., February 10, 1913.

The J. D. Maxwell Motor Corporation and the Maxwell Motor Company, Inc., of New York, each with \$10,000 capital stock, organized to manufacture motor vehicles, have opened Indiana headquarters in the Lemcke Building, Indianapolis.

The Capitol Body Company, Indianapolis, has been incorporated with \$10,000 capital stock to manufacture automobile tops and fenders. The directors are Elmer Hinshaw, Frederick W. Henschen and Elmer W. Hughey.

The National Automatic Tool Company, Richmond, Ind., has been incorporated with \$150,000 capital stock to manufacture tools and machinery. The directors are William F. Bockhoff, Louis F. Bockhoff, J. C. Bockhoff, Jesse Weichman and George H. Eggemeyer.

The city of Huntington, Ind., has closed a contract with C. F. Heims and H. E. Oskamp, Cincinnati, by which they will move their plants to Huntington and operate them under the name Huntington Machine & Foundry Company, with \$125,000 capital stock. Large punches and shears and two kinds of cement mixers will be manufactured.

Harry C. Clay, who receives credit for perfecting the traction engine manufactured by the Emerson-Brantingham Company, has been promoted to the position of mechanical engineer of the plant at Columbus, Ind., and also of the plant of the Geyser Mfg. Company, of Waynesburg, Pa.

The Hoosier Novelty Company, Shelbyville, Ind., has been incorporated with \$10,000 capital stock to manufacture metal and other articles. The directors are Roy E. Baker, Roscoe J. Patterson and James F. Tierney.

The Indiana Quarries Stone Company, Bedford, Ind., has let the contract for a building, which will be equipped with the necessary machinery. The building will be 62 x 703 ft.

The Clarence I. Hoffman Construction Company, Hammond, Ind., has increased its capital stock \$75,000.

The Rude Mfg. Company, Liberty, Ind., has been incorporated with \$300,000 capital stock to manufacture farming implements. The directors are S. B. Rude, J. F. Rude and W. A. Bryson.

The City Council of Richmond, Ind., has appropriated \$70,000 for new machinery for the municipal electric lighting and power plant.

The Laporte Carriage Company, Laporte, Ind., is declared solvent by the referee in bankruptcy, the receivership has been closed and the plant has resumed operations under its own management.

The Shelbyville Desk Company, Shelbyville, Ind., has been incorporated with \$30,000 capital stock to manufacture desks and other furniture. The directors are E. F. Manire, W. J. Kamire and E. A. Swain.

The Hoosier Warming & Ventilating Company, Muncie, Ind., has been incorporated with \$5000 capital stock to manufacture heating apparatus and heat and ventilate public buildings. The directors are Earl L. Clevenger, Ed. V. Fitzpatrick and W. D. Fitzpatrick.

The Spiegel Cabinet Company, Shelbyville, Ind., has increased its capital stock by \$45,000.

The Fairmount Tile Works, Fairmount, Ind., has been incorporated with \$36,000 capital stock to manu-

facture clay products. The directors are L. C. Lillard, M. E. Hollenbeck and H. M. Lillard.

Two large foundry buildings of the American Car & Foundry Company's plant at Terre Haute, Ind., which have not been used for a year or more, will be converted into shops for turning out steel material. The company is rebuilding the erecting shops which were burned.

Cincinnati

CINCINNATI, OHIO, February 10, 1913.

While considerable business is in sight, especially from the railroads, it appears to be the policy of the trade in general to postpone buying until after the policy of the incoming National Administration has been determined. Export business is still rather dull, although this is conceded to be a natural condition for the season. Electrical equipment and woodworking machinery are in good demand. Second-hand machinery is moving slowly, and no immediate improvement is anticipated.

There is a continued scarcity of skilled labor in practically all manufacturing lines.

On February 7 fire completely destroyed the plant of the Cincinnati Pulley Machinery Company, Covington, Ky. The loss is partially covered by insurance, and it is stated that the factory will be rebuilt at an early date. In addition to its own special equipment the company manufactured a line of machine tools for other firms.

The Bohlman-Wilson Foundry Company, Cincinnati, is rebuilding that portion of its plant recently destroyed by fire. Practically all the necessary equipment has been provided for.

D. Riebel & Sons, Columbus, Ohio, are preparing plans for a two-story brick factory building, 80 x 200 ft., to be erected by Rosenthal Brothers, textile operators.

The West Virginia Traction & Electric Company, Wheeling, W. Va., has tentative plans under way for improvements to its plant that will require the addition of a large pumping engine, with boilers, tanks and other special equipment.

The Pattin Brothers Company, Marietta, Ohio, contemplates moving its foundry to another location in the same city, and will add equipment to increase its present output.

It is rumored that the Norfolk & Western Railroad Company will soon enlarge its repair shops at Portsmouth, Ohio. Nothing is yet known as to machinery requirements.

Confirming last week's announcement, the Queen City Punch & Shear Company, Cincinnati, has definitely decided to move to Huntington, Ind., and will change its name to the Huntington Machine & Foundry Company. Considerable foundry equipment will be required.

It is rumored that the M. B. Grosh Ice Company, Lockland, Ohio, a new incorporation, has plans under way for the erection of an ice plant. No details are yet available.

The Ohio Marble Works Company, Piqua, Ohio, is having plans prepared for rebuilding its plant recently destroyed by fire. No machinery requirements have yet been given out.

James B. Schumacher, John S. Becker and others have organized a company to build a jobbing foundry on a site acquired at Winton place, Cincinnati. The new company will make a specialty of small as well as large gray iron castings. The proposed building will be of concrete construction, one-story and approximately 60 x 200 ft. The equipment has not yet been purchased.

The Piqua Handle Company, Piqua, Ohio, will make an addition to its plant that will greatly increase its present capacity.

St. Louis

ST. LOUIS, MO., February 10, 1913.

Quiet conditions continue in the machine tool market and while there has been no development showing a particular reason, other than general indisposition to eventuate plans at the present moment, there is a feeling among representatives that activity is not to be looked for in the immediate future. At the same time they see, from their reports, no reason to be excessively pessimistic over the spring prospects.

The Board of Public Improvements of St. Louis is looking into the feasibility of the city establishing its own incinerating plant, two concerns having been forced out of business by litigation over their being nuisances to the surrounding property owners near

where the plants were located. The city has forfeited the bond of the last contractor and is now disposing of its garbage by towing to an island owned by the municipality below the city.

The American Laundry Company, St. Louis, has bought a site and will erect and equip a \$40,000 laundry plant to take the place of its present plant which it has outgrown. The manager of the company is Charles D. Robinson, who states that the new plant will be equipped with entirely new machinery.

The Clingman Journal Cooler Company, Danville, Ill., with \$10,000 capital stock, has been incorporated by William H. Clingman, Charles R. Shannon and John M. Boyle to manufacture a patented device for keeping car journals cool.

The DeKalb Chemical Works, DeKalb, Ill., has been incorporated with \$10,000 capital stock by A. H. Harrison, P. N. Joslin and H. W. McEwen to equip a plant for the manufacture of special chemicals.

The officials of the Illinois Central announce that work will begin on the new roundhouse and shops for the company at East St. Louis the coming week. The buildings will cost about \$30,000 and the equipment about \$50,000, it is stated.

The Board of Public Improvements of St. Louis has approved plans for a new intake tower and necessary equipment to be built farther out into the Mississippi River and so constructed as to avoid all possibility of ice cutting off the city water supply. It will cost, with equipment, about \$450,000.

The Central Coin Controlled Locker Company, Belvidere, Ill., has been incorporated by W. C. Hayes, E. O. Andrews and F. D. E. Babcock to manufacture a patented device.

The Jordan River Lumber Company, with \$250,000 capital stock, has been incorporated by William J. L. Engle of New Orleans and others, and has purchased the Carre plant at Kiln, Miss., which it will remodel, increasing its capacity to 50,000,000 ft. of lumber annually. Others interested are J. L. Dantzler of New Orleans, C. F. Wiehe of Chicago and L. N. Dantzler of Gulfport, Miss.

The McNary Lumber Company, McNary, Ga., with \$500,000 capital stock, will build a double band saw mill with a capacity of 125,000 ft. of lumber daily. W. M. Cady is president.

The Arkansas Packing Company, 603 Citizens Bank Building, Little Rock, Ark., has completed its plans and specifications for its plant to be built at Pine Bluff, Ark., under the management of William Cargill.

A brick and tile manufacturing plant is to be installed at Harviell, Mo., by Frank Kittredge.

The National Terra Cotta Company, Kansas City, Mo., with \$150,000 capital stock, has been incorporated by Andrew F. Brooker, B. A. Green and Richard P. Edwards and will equip a plant.

The Marietta Cotton Oil Company, Marietta, Okla., has been incorporated with \$10,000 capital stock by W. L. Hagan and others and will equip a plant shortly.

The electric plant recently reported as contemplated at Sulphur Springs, Ark., will include about \$35,000 worth of equipment. Water works will be embraced in the plans and the machinery to be installed will include an initial unit of 75 hp., to be increased to 200 hp. in the electric division. Albert C. Moore of Joplin is engineer.

The city of Wynne, Ark., will receive bids until February 24 on improvements in its electric light system, the work to be done under the direction of R. C. Huston & Co., engineers, Memphis, Tenn.

An electric light plant and water works are contemplated by the city of Marksville, La., at an estimated expenditure of \$20,000. Mayor T. T. Fields will have charge of the work.

An electric light plant is to be built at Essex, Mo., by the Dexter Electric Light, Heat & Power Company, Dexter, Mo., which has applied for a franchise therefor.

A power house is to be built at Moberly, Mo., by the Moberly, Huntsville & Randolph Springs Railway, of which J. J. Munding of Huntsville, Mo., is chief engineer.

The Elk City Ice, Fuel & Light Company, Elk City, Okla., is planning to install a 200-kw. generator and also has plans for the equipment of an ice and cold storage plant. E. W. Merrifield is superintendent.

The Tulsa City Light, Heat & Power Company, Tulsa, Okla., has been incorporated by A. A. Small, A. B. Davis and G. B. Small.

The Tulsa Boiler & Sheet Iron Works, Tulsa, Okla., has completed its plans for the construction of a plant to cost about \$50,000. Work will begin at once.

The Union Petroleum Company, New Orleans, La., with \$200,000 capital stock, has been incorporated by

Charles P. Fenner, Edmond Phelps and A. C. Woodman, with construction and equipment plans not yet announced. Offices will be maintained in New Orleans and Philadelphia.

The Co-operative Oil & Mining Company, New Orleans, La., with \$250,000 capital stock, has been incorporated by James E. Glisson, Raymond A. Penick and James E. Vergnes, to develop property controlled by them.

The Terry Dairy Company, Little Rock, Ark., will install a refrigerating plant of 20 tons' capacity.

The Kanokla Oil Company, Muskogee, Okla., has been incorporated with \$50,000 capital stock by John Mosier, I. O. Stewart, R. M. Greenslade and others and will equip oil property controlled by them.

The D. J. Landers Lumber Company, Springfield, Mo., has plans for the establishment of a plant at Imboden, Ark.

A band sawmill is being built at Wabbaseka, Ark., to handle lumber from property recently bought there by the Dugger-Goshorn Stave & Lumber Company, Memphis, Tenn.

A sawmill is to be built at Benton, La., it is reported, by the Dubach Lumber Company, Dubach, La.

The St. Elmo Quarry Company, Springfield, Mo., recently incorporated with \$50,000 capital stock, by L. E. Hunt, C. A. Hubbard and others will develop marble deposits. The capacity of the equipment to be installed has not been determined.

The City Commissioners of Oklahoma City, Okla., have decided upon plans for a city garbage incinerator and have ordered advertisement for bids. The plant will have about 60 tons daily capacity.

The St. Louis Paper Can & Tube Company is having plans prepared for a two-story plant by Stephens & Pearson, Central National Bank Building, the cost to be about \$45,000, with equipment.

The Missouri & North Arkansas Railroad Company has plans for the construction of a machine shop at Eureka Springs, Ark., with equipment, to cost about \$10,000. A similar shop will be built and equipped at Harrison, Ark.

The Missouri Pacific Railway will build a roundhouse and machine shop at Joplin, Mo., the size and equipment not being determined as yet.

Plans are being prepared for the installation of water-works pumping machinery at Jefferson City, Mo., under the direction of Chester & Fleming, engineers, of Pittsburgh, Pa.

A water system to cost about \$25,000 is to be installed at Pittsburg, Mo., under the direction of the town authorities.

The Gould Cooperage & Lumber Company, Gould, Ark., with \$25,000 capital stock, has been incorporated by W. T. Leatherman, H. R. Huntington, A. D. Maus and others and a plant will be equipped shortly.

The City of Topeka, Kan., has authorized an extension of its water mains. Address city commissioner.

F. J. Fabian, Salt Lake City, Utah, states that he will rebuild, at a cost of \$25,000, the Murray canning factory at Murray, Utah, which burned last year.

The Central South

LOUISVILLE, KY., February 10, 1913.

Wintry weather of the typical kind has prevailed in this territory in the past week, and this has curtailed the demand for some special lines, such as ice-making machinery and quarrying equipment; but as it is entirely seasonable it has helped general business conditions and in turn laid the foundation for improved conditions in the machinery trade. Most reports indicate that there are a lot of new prospects, which is encouraging at this season, while orders are being booked in comfortable volume. Power equipment continues to be the leading item, both steam and electrical units being contracted for freely. Extensions of old plants, as well as plans for new, are taking care of a large part of the sales.

The Clark Motor Car Company, 415 West Green street, Louisville, has begun the manufacture of a patented brass gauge for use in handling liquids, especially oil and gasoline. The molding is now being done by contract, the machine work being completed in the auto concern's own shop. The company plans the enlargement of its facilities to take care of the new business if it develops favorably.

The Louisville Cotton Mills Company, which has been considering the use of electricity in its plant, has finally decided to continue the mechanical drive, and has let a contract to the Hoovens, Owens & Rentschler Company, Hamilton, Ohio, for an additional engine.

The company probably will install a comparatively small generator for the production of power to operate the machinery in a few departments, including the pickers, dye-house and waste-mill, and for this work motors will be needed.

The Louisville Pillow Company has purchased two new feeding machines from the Smith & Furbush Machine Company, Philadelphia.

The Speedway Tire Company, Louisville, has decided to locate its new factory at Twenty-third and Howard streets. An entire block probably will be occupied. H. L. Lewman, Falls City Construction Company, Realty Building, Louisville, may be addressed for details.

The Kentucky Utilities Company, Lexington, has purchased a franchise for the operation of a lighting system in Eminence, Ky., and will enlarge and improve the plant there.

The Anglo-American Mill Company, Owensboro, Ky., has announced plans for the erection of an addition 100 x 60 ft. and will install a lot of new machinery for the production of Midget flour mills.

The Middle West Utilities Company, Chicago, has acquired the plant of the Richmond Electric & Power Company, Richmond, Ky. L. B. Herrington, president of this company, is president of the Dix River Power Company, which is to build a \$1,000,000 water power plant in central Kentucky, indicating that the Middle West Utilities Company, which is controlled by the Insull interests, is to finance the hydro-electric project.

The Nashville, Chattanooga & St. Louis Railroad is building a machine shop of large capacity at Paducah, Ky. The general offices of the company are in Nashville, Tenn. A planer, two drills, two lathes and other machines will be installed.

Corbin, Ky., has completed arrangements for the sale of a bond issue authorized for the construction of a water works system, and will be in a position to let a contract in the near future. Address Mayor Wyrick.

The Tygart Valley Water Power & Electric Company, Carter, Ky., has completed organization and plans the construction of a power plant on Tygart Creek. M. K. Ratcliff may be addressed.

Appropriations asked of the Indiana Legislature by D. C. Peyton, superintendent of the Indiana Reformatory at Jeffersonville, across the river from Louisville, aggregate \$225,000. New boilers are included in the budget which has been submitted.

The Southern Textile Company, Paducah, Ky., has recently increased its capital stock to \$60,000, and is reported to be considering enlarging its plant. F. E. Lack is president of the concern, which manufactures knitting mill machinery.

Lewis & Drye, Bradfordsville, Ky., have leased a building in Lebanon, Ky., which will be converted into a garage and automobile repair shop. Machine tools for this department are to be purchased in the immediate future.

E. C. Atkins & Co., of Indianapolis, manufacturers of saws, have announced plans for the erection of a large building in Memphis, Tenn., which will be used as a warehouse and office building, as well as for shop purposes. The building is to be 50 x 165 ft., five stories. Memphis is the largest sawmill town in the country, and its importance from the standpoint of the saw business is of course great. J. W. Gladding is manager of the Memphis branch and J. E. Dilworth is his assistant.

The Nashville Creamery & Mfg. Company, Nashville, Tenn., has announced plans for the installation of additional machinery. Horace M. Wise is president and general manager.

The Anderson Hardware Company, Dickson, Tenn., is reported to have plans for the establishment of a cordage mill at that point.

ham, have secured a gas franchise and will build a gas plant at Tuscaloosa, Ala., where they also own the street railway.

The Sloss-Sheffield Steel & Iron Company announces a schedule of \$325,000 of mine improvements, including washers at Flat Top and Brookside, three tipples at Brookside, new fan at Flat Top, 3 miles of railroad at Russellville, Ala., etc.

The Reform Planing Mill Company, Reform, Ala., expects to have new plant in operation in 60 days. George A. Blessed is president.

W. E. Beverley, Thomasville, Ga., will install additional machinery in a planing mill purchased from A. T. Snodgrass.

Jonesboro, Ga., will establish a lighting and power plant.

Engineers Crook & Lanneau, Americus, Ga., have prepared plans for H. J. Bagley, of Americus, to establish a hydro-electric plant at Leesburg, Ga. He proposes to operate a grist mill and furnish power and lights for citizens.

The New Eden Plantation Company, Kissimee, Fla., A. E. Thomas, president, will install a syrup mill.

The Sanitary Cigar Salesman Company, Birmingham, Ala., incorporated with a capital stock of \$4000 to manufacture metal automatic device for selling cigars. Harwood M. Jones is president and G. W. Lindsay secretary and treasurer.

John L. Parker, B. H. Cooper and associates, Birmingham, Ala., have secured control of the Pep-To-Lac Company, of Gadsden, Ala. The capital stock has been increased from \$100,000 to \$500,000. It will establish a large plant in Birmingham.

M. L. Fleishell, Fullerton, La., will establish sawmills on a tract of 100,000 acres of timber land near St. Andrews Bay, Fla., recently purchased.

The Covington Mfg. Company, Headland, Ala., has been incorporated with \$10,000 capital stock to manufacture agricultural implements.

The Grayson Home Mixer Company, Grayson, Ga., has been incorporated with a capital stock of \$5000, with privilege to increase to \$20,000, to manufacture fertilizers. A. G. Adair, Sr., G. W. McCarty, Sr., and others are the incorporators.

The New Valdosta Gas Company, Valdosta, Ga., has been incorporated with a capital stock of \$100,000, and privilege to increase to \$200,000, to manufacture gas. Abial Winn and J. H. Hagerty, Valdosta, and W. C. Lewis, Tallahassee, Fla., are the incorporators.

The State Convict Department, Montgomery, Ala., contemplates establishing an ice plant on the convict farm at Wetumpka, Ala. T. A. Wall, of Wetumpka, is considering establishing a plant if the State does not.

Chipley, Fla., contemplates establishing municipal lighting plant. A. Myers is mayor.

The Upmago Lumber Company, with headquarters at Thomasville, Ga., has purchased a large timber tract near Metcalf, Ga. It will build a tram road and proposes to cut 40,000,000 ft. of lumber.

The Roberts Marble Company, Ball Ground, Ga., has been incorporated with capital stock of \$25,000 and privilege to increase to \$100,000, to quarry marble. A. W., A. P. and A. R. Roberts.

The Continental Marble & Granite Company, Canton, Ga., has been incorporated with a capital stock of \$25,000 and privilege to increase to \$100,000 to quarry marble and granite. B. F. Coggins, J. N. Scott and H. A. Heard are the incorporators.

The Ashville Ore Company, Ashville, Ala., has been chartered by G. L. Watkins, president, and others, with a capital stock of \$3000. It will mine iron ore.

The Jefferson Iron Ore Company, Birmingham, Ala., has been incorporated with a capital stock of \$1,000 by Thomas Dozier, president, and others. R. G. Slomcum is vice-president; A. F. Klummer, secretary and treasurer.

Birmingham

BIRMINGHAM, ALA., February 10, 1913.

The machinery and machine tool business continues fair and satisfactory, while the outlook is of the same character. The prospect of a good business in the mining field this year is especially good, there being a large number of new mining companies making openings, while the larger corporations will expend hundreds of thousands in improvements, many of which have been announced, especially by the Sloss-Sheffield Steel & Iron Company, the Republic Iron & Steel Company, and Tennessee Coal & Iron Company. The sawmill trade is also active and the foundries are constant customers.

Morris Brothers, of Philadelphia, majority owners of the Bessemer-Ensley electric railroad at Birmingham,

Texas

AUSTIN, TEXAS, February 8, 1913.

Spring planting has begun in the extreme southern part of Texas and within another week or ten days much corn will have been placed in the ground. Shipments of winter vegetables from the lower Rio Grande country and other points in the Gulf coast region to Northern markets are heavier than ever before known. It is estimated that in the next 90 days more than 10,000 cars of vegetables will be shipped from southern Texas points. The money derived from this industry will be of great benefit to the machinery trade, it is expected. Activity in the installation of new irrigation pumping plants continues unabated.

If a bill which is now pending in the State Legisla-

ture prohibiting the pollution of rivers and streams becomes a law many cities and towns of Texas that are now emptying their sewage into outlets of that character will be forced to install sewage disposal plants. Prospects are favorable for the enactment of the pending measure. In anticipation of this being done the Austin and several other of the larger cities are already taking steps toward the establishment of such plants.

An election of taxpayers of Temple will be held in April to vote on the proposition of issuing \$300,000 of bonds for municipal improvements to be divided as follows: \$10,000 for sanitary and storm sewers, \$15,000 for fire department apparatus and station, \$170,000 for street paving, and \$7,500 for other public works.

The City Council of Denison is investigating the matter of installing a sewage disposal plant.

The City Commission of Dallas is advertising for bids for the construction of a 6-in. sanitary sewer. About 6253 ft. of sewer pipe will be required for the work.

The Angleton Cotton Gin Company will install a cotton-seed oil mill at Angleton. F. M. Price is manager.

The Yoakum Ice Company is building an ice factory and cold storage plant at Yoakum, at a cost of \$50,000.

J. T. Witt and associates have been granted a franchise by the City Council of Denton, for the construction of an interurban railroad between Denton and the suburb of Cement City.

The Whittlesey Garage & Machine Company, which was recently organized at San Benito, will equip a machine shop. The incorporators are C. W. Whittlesey, James T. Valentine and James F. Valentine.

The Dawson Water Company will build a water-works plant and construct a distributing system at Dawson. Those interested are B. C. Rhome, Sr., R. J. Rhome and F. Frank Williams.

The Guadalupe Water Power Company is seeking authority from the State Legislature to build five dams on the Guadalupe River for the purpose of providing a water storage supply to operate hydroelectric plants which it will install.

The City Council of San Antonio has passed an ordinance providing that an election shall be held some time in March to vote on the proposition of issuing bonds for \$2,500,000, of which \$2,000,000 shall be used for the construction of a municipal water-works plant and distributing system or the purchase of the existing privately owned plant. The remaining \$500,000 is to be used for an extension of the sewer system.

C. H. Fowler will install a cotton gin near San Antonio.

The Alexandria Lumber Company will establish a lumber mill at Alexandria, La., which will have a daily capacity of 125,000 ft. It will replace the plant which was recently destroyed by fire.

H. E. Townsend is building a lumber mill near Texarkana.

W. D. Jackson will install a machine shop and establish a garage at Waxahachie.

The Washington Iron Works Company will enlarge its foundry plant at Sherman.

The Houston Lighting & Power Company will add two 600-hp. boilers to its power plant at Houston. It will also install a generator to increase the capacity of the plant 5000 kw. Among other new machinery will be a 40-hp. electric crane for heavy handling.

J. W. Wiley is promoting the establishment at Dallas of a plant for the manufacture of twine.

A. L. Jackson will establish a wood-working plant at Bay City.

The San Saba Mfg. Company will install a machine and repair shop at San Saba.

J. H. Baberley of Fort Stockton will open a sand and gravel pit at Bronte. He will buy machinery for its operation.

The Maud Mining Company will purchase an air compressor and other machinery for its mine at Mogollon, N. M.

The Tucumcari Light & Power Company will enlarge its electric light and power plant at Tucumcari, N. M.

The Mogollon Mines Company will install a new engine, new air compressor and other machinery at its property at Mogollon, N. M. E. A. Wayne is manager.

The United Railways of Yucatan, Mexico, will replace its large shops at Merida which were recently destroyed by fire. Considerable new machinery will be required.

W. L. Rynerson, who is operating El Tremblor mine, situated near El Tigre, State of Sonora, Mexico, under lease, will build a 30-ton mill on the property.

The Pacific Coast

SAN FRANCISCO, CAL., February 2, 1913.

The past month has brought out somewhat more business in machine tools than the corresponding period of several previous years, though the sales closed consist mostly of single tools and small groups. Attention has been devoted largely to the more important inquiries, which are steadily increasing, and from which considerable business is expected to develop very shortly. The closing of at least one large deal is expected within the present month. The Southern Pacific Railroad is buying occasional small lots, and while it has no large list out its aggregate business for the season may be fairly large. There are no large concentrated offerings of second hand tools on the market at present, but a new local shop has picked up practically a complete outfit in various parts of the coast.

Inquiry is especially strong for general contractors', quarry and mining machinery, and while only a few sales have been closed there is a large amount of business figuring. Plans are under way for several dredges of various types, and the demand for pumping engines is fully as strong as last year. Orders are being placed for the improvement of canneries and fruit packing houses all over the state. Woodworking machinery is not yet very active, but figures are being taken on some important installations.

Several of the Exposition concessions will require machinery, the first announced being the Aeroscope, a contrivance to raise passengers to a height of 268 ft. This will consist of a revolving steel tower with crane arms.

The Pacific Gear & Tool Works, this city, has ordered an 84-in. Gould & Eberhardt gear cutter. The Pomona Manufacturing Company, Pomona, Cal., has ordered a 60-in. gear cutter of the same make.

The Byron Jackson Iron Works has been taking figures on a large open-side planer, and is planning to install additional machinery during the summer.

The Commercial Iron Company has been incorporated in this city, with a capital stock of \$25,000, by J. L. Sebastian, D. O. Marks and W. W. Price. The company is installing a pump works on Fifth street at an expenditure of about \$15,000.

Among the large construction contracts recently let are a grading job on the Exposition grounds, to the Sunset Construction Company, and a large section of sea wall, let to the Daniel Contracting Company. The latter firm has secured a quarry at McNear's Point, and will put in a steam shovel, a locomotive and a number of rock cars.

T. K. Beard, contractor on the Oakdale, Cal., irrigation project, has ordered a large number of Koppel cars. A lot of similar cars have been purchased by the Western Salt Company, San Diego, Cal.

The Orenstein-Arthur Koppel Company is opening a branch office at Los Angeles, Cal., under the management of D. S. Laughland.

The Pacific Lime & Plaster Company is constructing a surface tramway to replace its aerial tram at Sonora, Cal.

A special meeting of stockholders of the Llewellyn Iron Works, Los Angeles, will be held March 25, to consider the creation of a bonded indebtedness of \$500,000 to enable the company to extend its plant and operations.

It is expected that definite plans for the projected new plant will be adopted shortly by the California Industrial Company, Los Angeles.

It is reported that the Baker Iron Works, Los Angeles, is planning to move its plant to a new site outside the city.

The Pacific Gas & Electric Company has prepared plans for a new steam substation in this city.

The Los Angeles Board of Education has taken figures on a lot of machine shop equipment for the San Pedro High School.

The French Pressing Machine Company has been incorporated at Los Angeles with a capital stock of \$100,000 by J. R. French, C. H. Kirkpatrick, A. D. Myers and E. L. Payne.

Imperial County, Cal., is figuring on a lot of high-way machinery.

The Modesto Manufacturing Company, Modesto, Cal., expects to commence operations within the next month in the manufacture of scrapers and implements.

It is reported that the Oro Light & Power Company, Oroville, Cal., will shortly install a lot of gold dredging equipment on Clear Creek, near Redding, Cal.

The Coast Foundry Company, San Francisco, has

been incorporated with a capital stock of \$10,000 by W. L. Luten, M. Lauten and A. Haase.

E. L. Kilsey is putting in a small machine shop at Saticum, Cal.

N. A. Durham and others operating as the Olympic Cotton Mill have secured a site for a new plant near Los Angeles.

The Mountain Machinery Company is starting business at Reno, Nev., making a specialty of mining and millinery equipment.

It is announced that the Yuba Consolidated Gold Fields will start work in the spring at Hammonton, Cal., on the largest gold dredge yet built, to cost about \$300,000.

An electric power plant is to be installed for the operation of the Sacred Mound mine and mill near Sierra City, Cal.

The Santa Fe Railroad has announced plans for the construction of a wheel shop in conjunction with its plant at San Bernardino, Cal.

The Mexican-American Iron Company, Los Angeles, has been incorporated with a capital stock of \$1,000,000 by N. E. Canfield, C. Guaman and G. McKenzie.

Eastern Canada

TORONTO, ONT., February 8, 1913.

Macdonald Buffer Car, Ltd., Montreal, has been incorporated by the Dominion Government with a capital stock of \$500,000. The company is authorized to manufacture all kinds of cars, car buffers, and railroad equipment of every kind. Maurice Alexander, advocate, Montreal, is one of the incorporators.

The McLaren Lumber Company, Toronto, has been incorporated with a capital of \$1,250,000, under Dominion letters patent, Robert C. Levesconte, barrister, Toronto, being one of the persons incorporated.

For the Grand Trunk Railway system 25 Mikado type of engines have been ordered from the American Locomotive Company, Schenectady, N. Y. These are the heaviest engines in use, it is claimed, by a Canadian railroad, and are intended for fast freight service. Fifty Pacific type engines have been ordered and of these 10 have been delivered by the Baldwin Locomotive Works, Philadelphia, and 15 by the Montreal Locomotive Works. Ten Pacific engines of a slightly heavier type have also been ordered from the Montreal Locomotive Works directly the order just mentioned is complete. These are intended for heavy passenger service between Montreal and Toronto and between Niagara Falls and the Sarnia tunnel. Fifteen large standard switching engines have been ordered from the Canadian Locomotive Works, of Kingston. These engines are for use in the large terminals of the Grand Trunk System.

It is stated that the Seaman-Kent Company will double its plant at Fort William, Ont.

The Robert Stewart Company, which operates planing mills and kindred works at Guelph, Ont., is expected to erect a new factory there in the near future.

The Anker-Holth Company, manufacturer of cream separators, will have its plant at Sarnia, Ont., in operation in a short time. The company's headquarters are at Chicago, and it has a branch at Port Huron.

The Elmira Furniture Company, Elmira, Ont., is preparing to build a large addition to its factory.

The Imperial Oil Company, Sarnia, Ont., proposes to increase its capital stock of \$6,000,000 to \$9,000,000.

The Gerhard Heintzman Company, Toronto, is erecting a five-story piano factory building at 75 Sherbourne street, to cost \$25,000.

The controllers of Toronto City Council have decided to give the preference to the John Inglis Company, a Toronto firm, in awarding the contract for water tube boilers for the main pumping station. Works Commissioner Harris had recommended the tender of the Babcock & Wilcox Company, a Scotch-made boiler. The Inglis tender did not comply with the specifications, but Mr. Harris said it would be satisfactory, and the difference in cost is small.

The Sherman-Cooper Company, Ltd., 1051 Eastern avenue, Toronto, has made an assignment of its assets and liabilities to its creditors, with Osler Wade acting as assignee. The firm was organized in 1906 with a capital of \$40,000 for the manufacture of gasoline engines. J. P. House was president and H. D. Odell secretary-treasurer and manager.

The big corundum mills at Craigmont, Ont., were destroyed by fire some days ago. The loss is estimated at \$500,000, and 160 men are thrown out of employment. The company paid last year in wages \$120,000.

The Preston Car & Coach Company, Preston, Ont.,

will build four additional erecting shops, each 60 x 200 ft., and a two-story mill, which will double the capacity of its plant.

The British-Canadian Cannery, Ltd., Hamilton, Ont., will build a plant at Benheim, Ont., next spring upon a four-acre site, the estimated cost \$40,000.

The Owen Sound Rolling Mills Company, Ltd., Owen Sound, Ont., has been incorporated with a capital stock of \$500,000, to manufacture wrought iron and steel pipe and tubing, bars, etc. H. J. Macdonald, J. Drew, F. Watt and P. J. Ryde of Guelph are the directors.

The Canadian Engines, Ltd., Dunnville, Ont., is having plans prepared for extensive additions to be made to its plant next spring.

The Napanee Iron Works, Ltd., Napanee, Ont., will build a new boiler shop at its plant and equip it with modern boiler making machinery.

Government Purchases

WASHINGTON, D. C., February 10, 1913.

The Bureau of Yards and Docks, Navy Department, Washington, will open bids February 15 for furnishing and installing in the central power plant, United States Naval torpedo station, Newport, R. I., two 450 cu. ft. of free air per minute air compressors, one to be motor-driven and the other steam engine driven, supplied complete with accessories, including two inter-coolers, one after-cooler and air receiver, air piping, etc. The estimated cost is \$6,000.

The Constructing Quartermaster, Vancouver, Wash., will open bids February 25 for removing center boiler of battery of three furnishing and installing boiler at pumping plant at the Vancouver barracks.

The Paymaster General, Navy Department, Washington, will open bids February 25 for installing a one-man control on north side of coaling plant, navy yard, New York, under schedule 5150, and on March 5, under schedule 5163, class 21, for two fuel oil pumps for delivery at Puget Sound.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 4 on its recent large list for materials and supplies for the navy yards as follows:

Schedule 5102, class 1, one crankshaft lathe—Bidder 84, Niles-Bement-Pond Company, New York, \$28,900.

Schedule 5105, class 2, one precision bench lathe—Bidder 82, Manning, Maxwell & Moore, New York, \$1,039; 93, Prentiss Tool & Supply Company, New York, \$879.15. Class 3, one toolroom lathe—Bidder 38, Fairbanks Company, Washington, D. C., \$947; 59, Kemp Machinery Company, Baltimore, Md., \$895; 82, Manning, Maxwell & Moore, New York, \$967.75; 84, Niles-Bement-Pond Company, \$925.40. Class 4, three bench lathes—Bidder 38, Fairbanks Company, Washington, \$857; 59, Kemp Machinery Company, Baltimore, Md., \$856.67; 82, Manning, Maxwell & Moore, New York, \$1,000; 84, Niles-Bement-Pond Company, New York, \$947.10; 93, Prentiss Tool & Supply Company, New York, \$850.05 and \$789.80. Class 5, two lathes—Bidder 38, Fairbanks Company, Washington, \$1,030; 59, Kemp Machinery Company, Baltimore, Md., \$1,027; 82, Manning, Maxwell & Moore, New York, \$1,070; 84, Niles-Bement-Pond Company, New York, \$1,144.10; 93, Prentiss Tool & Supply Company, New York, \$1,118.10 and \$1,036.80. Class 6, one tool-makers' engine lathe—Bidder 82, Manning, Maxwell & Moore, New York, \$1,091; 97, Pratt & Whitney Company, Hartford, Conn., \$1,332. Class 7, one geared-head electric-motor-driven lathe and three semi-enclosed electric-motor-driven lathes—Bidder 38, Fairbanks Company, Washington, D. C., \$5,628; 82, Manning, Maxwell & Moore, New York, \$5,847.60; 84, Niles-Bement-Pond Company, New York, \$5,737.30; 93, Prentiss Tool & Supply Company, New York, \$1,324.65, \$1,255.75, \$1,507.95, \$1,423.60, \$1,438.25 and \$1,369.10. Class 8, one motor-driven instantaneous-change gear engine lathe—Bidder 36, Frevet Machinery Company, New York, \$2,566; 38, Fairbanks Company, Washington, D. C., \$2,377; 82, Manning, Maxwell & Moore, New York, \$3,055 and \$3,300; 83, D. Nast Machinery Company, Philadelphia, Pa., \$2,850; 84, Niles-Bement-Pond Company, New York, \$3,555 and \$3,185; 93, Prentiss Tool & Supply Company, New York, \$2,100. Class 9, one heavy extension gap engine lathe—Bidder 38, Fairbanks Company, Washington, \$4,367; 84, Niles-Bement-Pond Company, New York, \$5,380; 93, Prentiss Tool & Supply Company, New York, \$4,069. Class 10, one motor-driven flat turret lathe—Bidder 57, Jones & Lamson Machine Company, Springfield, Vt., \$1,800; 82, Manning, Maxwell & Moore, New York, \$1,925; 93, Prentiss Tool & Supply Company, New York, \$1,553.95. Class 11, one slotting machine, 10 in., motor-driven—Bidder 82, Manning, Maxwell & Moore, New York, \$1,426; 83, D. Nast Machinery Company, Philadelphia, Pa., \$1,300; 84, Niles-Bement-Pond Company, New York, \$1,385; 87, Newton Machine Tool Works, Inc., Philadelphia, Pa., \$1,515. Class 12, one self-contained motor-driven plain-cylinder gear grinding machine—Bidder 39, Walter H. Foster Company, New York, \$3,460; 93, Prentiss Tool & Supply Company, New York, \$3,400. Class 13, one horizontal boring, drilling and milling machine—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$2,716; 66, Lucas Machine Tool Company, Cleveland, Ohio, \$4,108; 82, Manning, Maxwell & Moore, New York, \$2,984; 93, Prentiss Tool & Supply Company, New York, \$3,152.50 and \$3,192.75. Class 14, one centering machine—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$350; 82, Manning, Maxwell & Moore, New York, \$532. Class 15, one vertical boring and turning mill—Bidder 12, Bullard Machine Tool Company, Bridgeport, Conn., \$331; 41, Gisholt Machine Company, New York, \$2,090 and \$2,520; 59, Kemp Machinery Company, Baltimore, Md., \$1,893; 82, Manning, Maxwell & Moore, New York, \$1,648.60; 84, Niles-Bement-Pond Company, New York, \$3,060; 93, Prentiss Tool & Supply Company, \$1,616. Class 16, one boring and turning mill—Bidder 41, Gisholt Machine Company, New York, \$4,370 and \$4,940; 82, Manning, Maxwell & Moore, New York,

\$4,532; 93, Prentiss Tool & Supply Company, New York, \$3,613 and \$3,912.45. Class 17, one engraving machine, electric motor-driven—Bidder 82, Manning, Maxwell & Moore, New York, \$691. Class 18, three upright drilling machines—Bidder 36, Frevert Machinery Company, New York, \$599; 38, Fairbanks Company, Washington, \$527; 59, Kemp Machinery Company, Baltimore, Md., \$443.34; 82, Manning, Maxwell & Moore, New York, \$666; 84, Niles-Bement-Pond Company, New York, \$498.70 and \$509.40; 93, Prentiss Tool & Supply Company, New York, \$525 and \$703.80. Class 19, one motor-driven radial drilling machine—Bidder 82, Manning, Maxwell & Moore, New York, \$953.50; 84, Niles-Bement-Pond Company, \$899.58; 90, National Contracting Company, New York, \$835; 93, Prentiss Tool & Supply Company, New York, \$975.40. Class 20, one open-side planing machine—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$2,572; 82, Manning, Maxwell & Moore, New York, \$3,200. Class 21, one medium metal planing machine—Bidder 38, Fairbanks Company, Washington, \$1,317; 59, Kemp Machinery Company, Baltimore, Md., \$1,330; 82, Manning, Maxwell & Moore, New York, \$1,291.50; 84, Niles-Bement-Pond Company, New York, \$1,545; 93, Prentiss Tool & Supply Company, New York, \$1,400. Class 22, one motor-driven cold metal saw—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$1,436; 82, Manning, Maxwell & Moore, New York, \$1,620; 87, Newton Machine Tool Works, Inc., Philadelphia, Pa., \$1,445 and \$1,889; 93, Prentiss Tool & Supply Company, New York, \$1,660; 135, Vandyc-Churchill Company, New York, \$1,550. Class 23, one combination cutter, reamer and twist drill grinder—Bidder 36, Frevert Machinery Company, New York, \$276; 59, Kemp Machinery Company, Baltimore, Md., \$276; 82, Manning, Maxwell & Moore, New York, \$304; 93, Prentiss Tool & Supply Company, New York, \$275. Class 24, one back geared heavy duty crank shaper—Bidder 38, Fairbanks Company, Washington, \$667; 45, Garvin Machine Company, New York, \$1,077; 59, Kemp Machinery Company, Baltimore, Md., \$729; 82, Manning, Maxwell & Moore, New York, \$905; 84, Niles-Bement-Pond Company, New York, \$910 and \$930; 93, Prentiss Tool & Supply Company, New York, \$674.95, \$732.15, \$839.95 and \$891.15. Class 25, one back geared heavy duty crank shaper—Bidder 38, Fairbanks Company, Washington, \$927; 45, Garvin Machine Company, New York, \$1,554; 59, Kemp Machinery Company, Baltimore, Md., \$1,015; 82, Manning, Maxwell & Moore, New York, \$1,318 and \$1,388; 84, Niles-Bement-Pond Company, New York, \$1,340.75; 93, Prentiss Tool & Supply Company, New York, \$989.15, \$1,075, \$1,260 and \$1,340.20. Class 26, one No. 2 B heavy plain milling machine—Bidder 7, Brown & Sharpe Mfg. Company, Providence, R. I., \$1,673.20 and \$1,428; 82, Manning, Maxwell & Moore, New York, \$2,045; 84, Niles-Bement-Pond Company, New York, \$1,433.41; 93, Prentiss Tool & Supply Company, New York, \$1,596.68 and \$1,616.68. Class 27, one No. 3 A universal milling machine—Bidder 7, Brown & Sharpe Mfg. Company, Providence, R. I., \$2,060.20 and \$2,136.75; 82, Manning, Maxwell & Moore, New York, \$2,377.80; 84, Niles-Bement-Pond Company, New York, \$2,225.26; 93, Prentiss Tool & Supply Company, New York, \$2,064. Class 28, one No. 4B plain milling machine—Bidder 7, Brown & Sharpe Mfg. Company, Providence, R. I., \$2,136.75; 82, Manning, Maxwell & Moore, New York, \$2,379.80; 84, Niles-Bement-Pond Company, New York, \$2,368.28; 93, Prentiss Tool & Supply Company, New York, \$2,081.45 and \$2,101.45. Class 29, three wet tool emery grinders—Bidder 22, James A. Clark, Jr., Electric Company, Louisville, Ky., \$228; 59, Kemp Machinery Company, Baltimore, Md., \$410.83; 82, Manning, Maxwell & Moore, New York, \$298.65; 93, Prentiss Tool & Supply Company, New York, \$270.30. Class 30, three power hack saws—Bidder 36, Frevert Machinery Company, New York, \$360; 59, Kemp Machinery Company, Baltimore, Md., \$645; 82, Manning, Maxwell & Moore, New York, \$644.70. Class 31, three hand-power arbor presses—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$199; 66, Lucas Machine Tool Company, Cleveland, Ohio, \$380; 82, Manning, Maxwell & Moore, New York, \$199; 93, Prentiss Tool & Supply Company, New York, \$199. Class 32, one hand-power embossing machine—Bidder 82, Manning, Maxwell & Moore, New York, \$48. Class 33, one combined band saw filing and setting machine—Bidder 35, J. A. Fay & Egan Company, Cincinnati, \$60; 59, Kemp Machinery Company, Baltimore, Md., \$78.30; 82, Manning, Maxwell & Moore, New York, \$215. Class 34, one motor-driven radial drill, Bidder 38, Fairbanks Company, Washington, D. C., \$987; 82, Manning, Maxwell & Moore, New York, \$994; 84, Niles-Bement-Pond Company, New York, \$952.75; 90, National Contracting Company, New York, \$1,080; 93, Prentiss Tool & Supply Company, New York, \$1,000. Class 35, one motor-driven double ended punch and shear—Bidder 21, Cleveland Punch & Shear Works, Cleveland, Ohio, \$2,100; 36, Frevert Machinery Company, New York, \$1,920; 59, Kemp Machinery Company, Baltimore, Md., \$2,048; 82, Manning, Maxwell & Moore, New York, \$2,560; 84, Niles-Bement-Pond Company, New York, \$2,452.85; 93, Prentiss Tool & Supply Company, New York, \$2,240.20; 120, Wickes Bros., Saginaw, Mich., \$1,990. Class 36, one pipe threading and cutting machine—Bidder 36, Frevert Machinery Company, New York, \$378; 59, Kemp Machinery Company, Baltimore, Md., \$528; 82, Manning, Maxwell & Moore, New York, \$898.90; 84, Niles-Bement-Pond Company, New York, \$1,070; 93, Prentiss Tool & Supply Company, New York, \$826.70. Class 37, one full 4-ft. motor-driven universal radial drilling machine—Bidder 82, Manning, Maxwell & Moore, New York, \$1,654; 84, Niles-Bement-Pond Company, New York, \$2,190; 90, National Contracting Company, New York, \$1,890; 93, Prentiss Tool & Supply Company, New York, \$1,716.15. Class 38, one hydraulic stanchion pipe bender—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$1,035; 84, Niles-Bement-Pond Company, New York, \$1,782. Class 39, one geared motor-driven plate bending rolls—Bidder 21, Cleveland Punch & Shear Works, Cleveland, Ohio, \$1,200; 36, Frevert Machinery Company, New York, \$1,463; 59, Kemp Machinery Company, Baltimore, Md., \$1,426; 82, Manning, Maxwell & Moore, New York, \$1,267; 129, Wickes Bros., Saginaw, Mich., \$1,238. Class 40, one motor-driven patternmaker's extension bed gap lathe—Bidder 35, J. A. Fay & Egan Company, Cincinnati, Ohio, \$1,546.95; 82, Manning, Maxwell & Moore, New York, \$1,704; 92, Oliver Machinery Company, New York, \$1,675 and \$1,975; 93, Prentiss Tool & Supply Company, New York, \$1,319.75. Class 41, one patternmaker's 12-in. motor head speed lathe—Bidder 35, J. A. Fay & Egan Company, Cincinnati, Ohio, \$396.20; 82, Manning, Maxwell & Moore, New York, \$176.15; 92, Oliver Machinery Company, New York, \$179 and \$279; 93, Prentiss Tool & Supply Company, New York, \$385.85 and \$232.80; 150, American Woodworking Machine Company, Rochester, N. Y., \$309. Class 42, one universal wood worker—Bidder 36, Frevert Machinery Company, New York, \$980; 59, Kemp Machinery Company, Baltimore, Md., \$955.68; 82, Manning, Maxwell & Moore, New York, \$1,006.50; 93, Prentiss Tool & Supply Company, New York, \$997.29, \$894.74 and \$917.59. Class 43, one universal wood trimmer—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$134.50; 82, Manning, Maxwell & Moore, New York, \$97.75; 92, Oliver Machinery Company, New York, \$100. Class 44, two improved bench wood trimmers—Bidder 59, Kemp Machinery Company, Baltimore, Md., \$25.50; 82, Manning, Maxwell & Moore, New York, \$25.60; 92, Oliver Machinery Company, New York, \$27. Class 45, one motor-driven universal double-arbor saw bench—Bidder 35, J. A. Fay & Egan Company, Cincinnati, Ohio,

\$640.55 and \$535.55; 36, Frevert Machinery Company, New York, \$517; 59, Kemp Machinery Company, Baltimore, Md., \$622; 82, Manning, Maxwell & Moore, New York, \$591.75; 92, Oliver Machinery Company, New York, \$615; 93, Prentiss Tool & Supply Company, New York, \$525.35 and \$514.35; 150, American Woodworking Machine Company, Rochester, N. Y., \$845 and \$825. Class 46, one motor-driven 20-in. hand planer and jointer—Bidder 35, J. A. Fay & Egan Company, Cincinnati, Ohio, \$486.55; 36, Frevert Machinery Company, New York, \$522; 59, Kemp Machinery Company, Baltimore, Md., \$517; 82, Manning, Maxwell & Moore, New York, \$345.45; 92, Oliver Machinery Company, New York, \$565; 93, Prentiss Tool & Supply Company, New York, \$522 and \$633; 150, American Woodworking Machine Company, Rochester, N. Y., \$227.45. Class 47, one hand driven slip roll former—Bidder 36, Frevert Machinery Company, New York, \$44; 59, Kemp Machinery Company, Baltimore, Md., \$49; 61, Knox & Brother, New York, \$38.90; 82, Manning, Maxwell & Moore, New York, \$134.25 and \$123.25. Class 48, one vertical turret lathe—Bidder 12, Bullard Machine Company, Bridgeport, Conn., \$2,355; 82, Manning, Maxwell & Moore, New York, \$3,092.50. Class 49, one motor-driven sensitive bench drill—Bidder 22, James A. Clark, Jr., Electric Company, Louisville, Ky., \$146; 24, Diehl Mfg. Company, Elizabethport, N. J., \$310.10; 36, Frevert Machinery Company, New York, \$107; 59, Kemp Machinery Company, Baltimore, Md., \$210. Class 52, one motor and blower—Bidder 48, General Electric Company, Schenectady, N. Y., \$10,980; 149, Buffalo Forge Company, Buffalo, N. Y., \$15,617. Class 53, three electric hoist cranes—Bidder 82, Manning, Maxwell & Moore, New York, \$1,367; 84, Niles-Bement-Pond Company, New York, \$2,350.

Trade Publications

Graphite Products.—Jos. Dixon Crucible Company, Jersey City, N. J. Catalogue. Size 6 x 9 in.; pages, 104. Lists a few of the products of this company which include graphite in practically all forms. Among the ones illustrated are crucibles, muffles, stoppers, sleeves, foundry facings, lubricants and a protective paint. Brief descriptions of these are given with lists of the different sizes in which they are made.

Cotter-Pins.—Andrew C. Campbell, Inc., Waterbury, Conn. Folder. Points out the advantages of using the Campbell self-spreading cotter-pin which consists of a piece of half-round wire bent so as to provide an offset eye at one end and have two limbs of unequal length, the tip of the longer one being bent at an angle across the other. In use when the eye is given a blow, the short limb will be driven longitudinally with reference to the other end and by the engagement of the tips the separation of the pin is caused. There are several illustrations showing the way in which these pins are inserted, locked and removed and a list of the various sizes in which they are made is also given. An illustrated description of this pin appeared in *The Iron Age*, August 1, 1912.

Rotary Gas Producers.—Chapman Engineering Company, Mt. Vernon, Ohio. Catalogue. Illustrates and describes a rotary gas producer which possesses as its distinctive features automatic spreading of the coal to a predetermined level, continuous agitation without an agitating member and continuous ash discharge. An illustrated description of this producer appeared in *The Iron Age*, October 17, 1912.

Fans.—Buffalo Forge Company, Buffalo, N. Y. Catalogue No. 181-E. Contains data on electric fans for blowing, exhausting, ventilating, cooling and drying. These are made for use on either direct or alternating current circuits and range in capacity from units having an output of 60 cu. ft. per minute up to mill exhausters capable of delivering 29,850 cu. ft. at a pressure of 6 oz. Different types of fans are illustrated and briefly described and tables of speeds, capacities and horsepower are included.

Fibre Washers and Disks.—Brandywine Fibre Products Company, P. O. Box 122, Wilmington, Del. Pamphlet. Lists a line of hard or flexible fibre washers and disks which are made in sizes ranging from 1/2 to 12 in. in diameter, and from 1/16 to 1/2 in. thick. Mention is also made of other fibre products, such as sheet fibre, gear blanks, brakeshoes, etc.

Iron Cement.—Smooth-On Mfg. Company, 573 Communipaw avenue, Jersey City, N. J. Folder. Calls attention to the use of Smooth-On iron cement No. 7, which is designed for stopping leaks in concrete. A number of typical repairs made with this cement are shown, with a brief text description of the principal points.

Steam Shovel and Dipper Dredge Repair Parts.—Edgar Allen American Manganese Steel Company, McCormick Building, Chicago, Ill. Bulletin No. 55. Calls attention to the advantages of using Stag brand of manganese steel for steam shovel and dipper dredge repair parts. The various pieces are all illustrated and there are brief references to the special requirements of each.

Small Electric Motors.—Ft. Wayne Electric Works of the General Electric Company, Ft. Wayne, Ind. Bulletin No. 1146, superseding No. 1122. Treats of a line of fractional horsepower electric motors and their applications. The different styles are shown assembled and unassembled and among the applications illustrated are the use of the motor for driving an air compressor, a forge blower and several types of drilling machines.

Cranes.—Alliance Machine Company, Alliance, Ohio. Catalogue. Size, 7 3/4 x 11 in.; pages, 88. Calls attention to the various types of cranes built by this company. A partial list of users occupies eight pages and this is followed by illustrations of the different cranes, with brief mention of their special features. Space is also given to hydraulic machinery, punching and shearing machinery, steam hammers, scale cars and charging larries, copper converting machinery, coke machinery and machinery for rolling mills.

